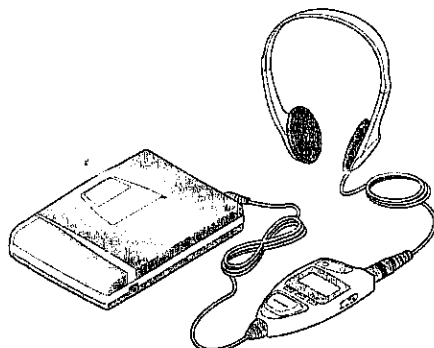


SHARP SERVICE MANUAL

No. S8641MDS50//X



MD-S50 MD-S50X

Illustration: MD-S50



• In the interests of user-safety the set should be restored to its original condition and only parts identical to those specified should be used.

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MD-S50/MD-S50X

FOR A COMPLETE DESCRIPTION OF THE OPERATION OF THIS UNIT, PLEASE REFER TO THE OPERATION MANUAL.

SPECIFICATIONS

● General

Power source:
(MD-S50)

DC 3.6 V (rechargeable lithium-ion battery x 1)

DC 5 V (AC adaptor)

AC 120V, 60 Hz

Power source:
(MD-S50X)

DC 3.6 V (rechargeable lithium-ion battery x 1)

DC 5 V (AC adaptor)

AC 110 to 240V, 50/60 Hz

Power consumption:

0.15 A (AC adaptor)

4 W

Output power:

RMS; 20mW (10 mW + 10mW)

0.2% T.H.D.)

Rechargeable battery performance:
(Fully charged)

Approx. 4 hours (continuous play)

Output level:

	Specified output	Maximum output level	Load impedance
Headphones	—	10 mW + 10 mW	16 ohms
LINE	425mV (-12dB)	—	50 kohms

Dimensions:

Width: 2-15/16" (74 mm)

Height: 4-3/16" (106 mm)

Depth: 23/32" (17.9 mm)

Specifications for this model are subject to change without prior notice.

Weight:

0.33 lbs. (150 g) with rechargeable battery

Output jack:

Headphones

● MiniDisc Player

Type:

Portable MiniDisc Player

Signal readout:

Non-contact, semi-conductor laser pick-up

Audio channels:

2

Frequency response:

20 - 20,000 Hz $\pm$ 3 dB

Rotation speed:

Approximately 400 to 900 rpm

Error correction:

ACIRC (Advanced Cross Interleave Reed-Solomon Code)

Coding:

ATRAC (Adaptive Transform Acoustic Coding)

D/A converter:

1-bit

Sampling frequency:

44.1kHz

Modulation system:

EFM (Eight to Fourteen Modulation)

Wow and flutter:

Unmeasurable (less than $\pm 0.001\%$ W.peak)

● Headphones

Type:

Stereo dynamic headphones

(MD-S50)

(Overhead type)

Type:

Inner-ear dynamic

(MD-S50X)

Impedance:

19 ohms

(MD-S50)

Impedance:

16 ohms

(MD-S50X)

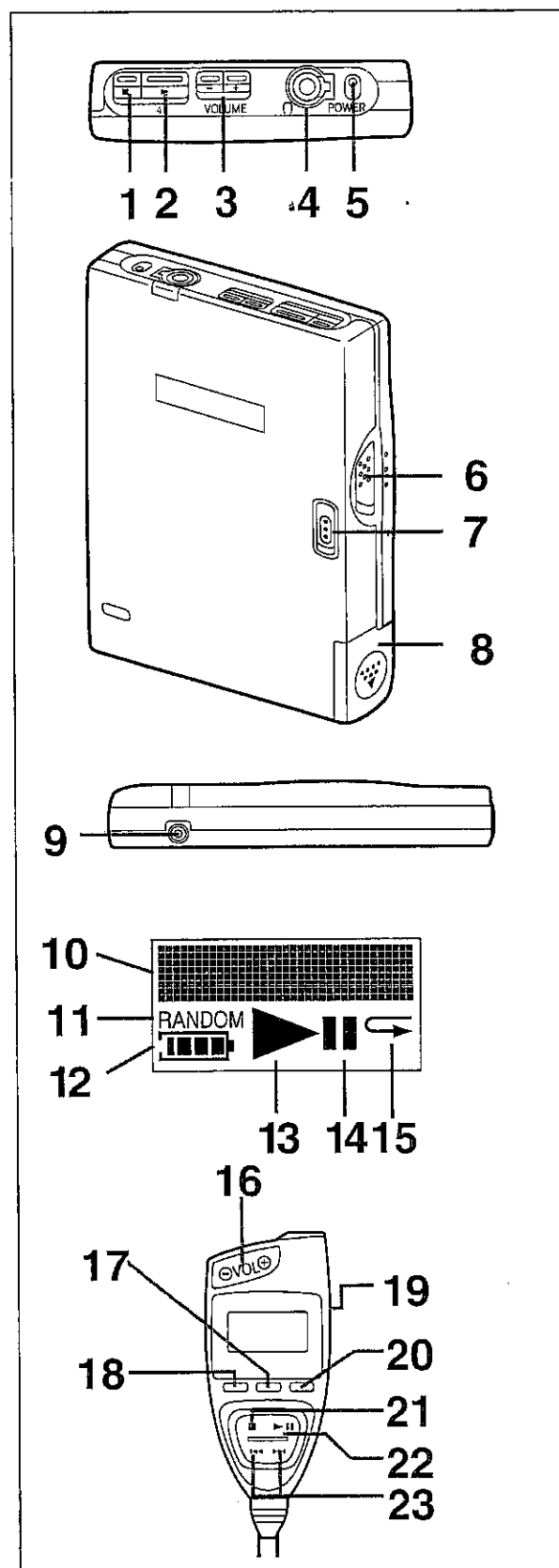
BATTERY DISPOSAL (FOR MD-S50 ONLY)

Contains nickel cadmium (or sealed lead) battery. Must be recycled or disposed of properly. Remove the battery from the product and contact federal or state environmental agencies for information on recycling and disposal options.

NAME OF PARTS

■ Main unit

1. Stop/Power Off Button: ■
2. Play/Fast Forward Button: ►/►►
3. Volume Buttons: – and +
4. Headphones Jack
5. Power Indicator
6. Disc Open Knob
7. Hold Switch
8. Rechargeable Lithium-Ion Battery Compartment
9. External DC Power Input Jack



■ Remote control unit

10. Character Information Display
11. Random Indicator
12. Battery Indicator: ■■■■
13. Play Indicator: ►
14. Pause Indicator: ■■
15. Repeat Indicator: ⇐
16. Volume Control
17. Play Mode Button
18. Bass Button
19. Hold Switch
20. Display Button
21. Stop/Power Off Button: ■
22. Play/Pause Button: ►■
23. Fast Reverse/Fast Forward Button: ◀◀/▶▶

■ Rechargeable battery power

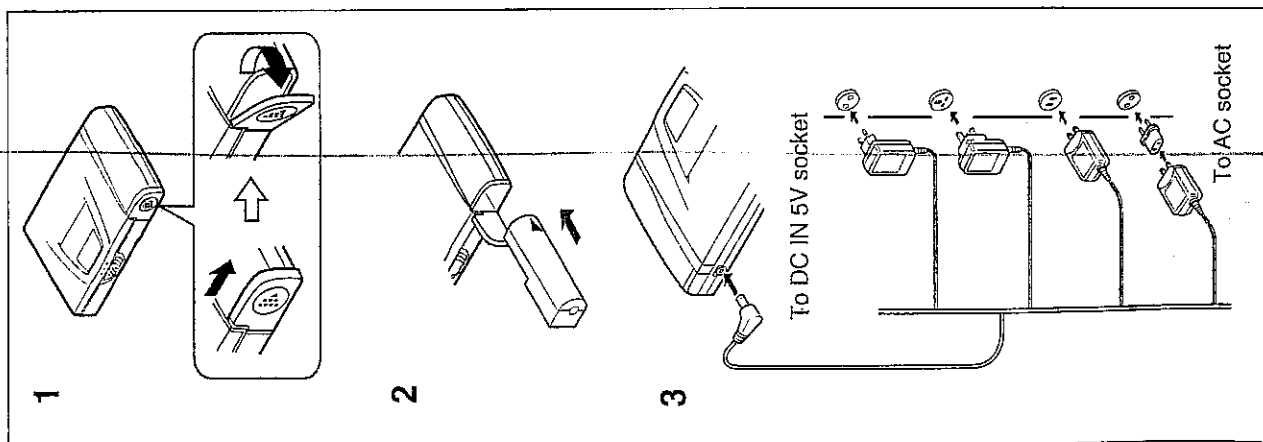
Be sure to fully charge the rechargeable battery when using it for the first time or after a long period of storage.

- 1 Open the battery compartment cover.
- 2 Insert the rechargeable battery, and replace the battery compartment cover.
- Insert the side with the arrow first.
- 3 Plug the AC adaptor into an AC socket, and then insert the plug on the AC adaptor lead into the DC IN 5V socket.
- 4 Press the ► button, and then press the ■ button to turn off the power.

- After about 7 seconds, the POWER indicator will flash, and the battery will begin charging.
- It is not necessary to perform step 4 above if the battery being recharged is low on capacity. Once the AC adaptor is connected, the battery will begin charging within several seconds to 2 minutes.
- Battery charging will be complete in 2.5 hours. When battery charging begins, the POWER indicator will flash. When the charging is complete, it will go out.

Notes:

- After charging has been completed, the AC adaptor may be left connected.
- The battery will not be charged whilst the main unit is operating.
- If the AC adaptor is removed from the main unit or from the AC socket whilst charging, the POWER indicator will flash for about 1 minute.



■ Rechargeable battery

operating time

After the battery has been fully charged, it can be used continuously for approximately 4 hours.

- While the unit is being operated, the battery indicator will appear on the remote control. As the battery charge is reduced from use, the bars in the battery indicator will go out one by one.
- When the battery is almost completely exhausted, the battery indicator itself will flash.
- When the battery is completely exhausted, "Lo BATT" will appear in the display. The power will be disconnected automatically. Recharge the battery.

■ Service life of the rechargeable battery

- A rechargeable lithium-ion battery is the only kind that can be used. Even if the battery supplied with the unit is not used, you should charge it at least once every three months because of the special quality of this battery.
- Do not use any battery other than that specified. Use of other batteries may cause malfunctions.
- The rechargeable battery can be charged approximately 300 times.
- When the operating time is reduced to half the normal amount of time, even after a full charge is performed, replace the battery with a new one.
- When charging or when using the rechargeable battery, use it within an ambient temperature range of 5°C to 35°C.

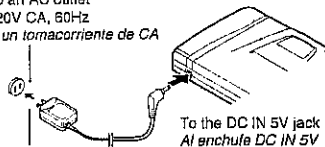
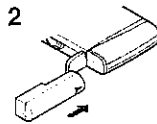
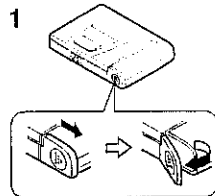
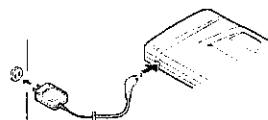
Many potential "problems" can be resolved by the owner without calling a service technician. If something seems to be wrong with this product, check the following before calling your authorized SHARP dealer or service center.

PROBLEM	CAUSE
The power does not turn on.	● The AC adaptor is disconnected. ● The rechargeable battery is exhausted. ● The unit is in the safety mode. ● The disc holder is not closed securely.
Charging cannot be performed.	● It takes a maximum of up to 2 minutes while the unit checks the condition of the rechargeable battery and actually starts recharging. ● After charging a rechargeable battery which has not been used very often, insert it into the unit, play a disc (for several seconds), and then turn off the power to the main unit.
Even though an operation button is pressed, the unit will not function.	● The unit is in the safety mode. ● The remote control unit plug or headphone plug is not inserted firmly. ● The rechargeable battery is exhausted. ● The disc holder is not closed securely.
No sound is heard from the headphones.	● The volume is set too low. ● The remote control unit or headphones are not plugged in.
Playback is interrupted.	● The rechargeable battery is exhausted. ● The unit is receiving excessive vibration.

When an error message is displayed on the display, proceed as follows:

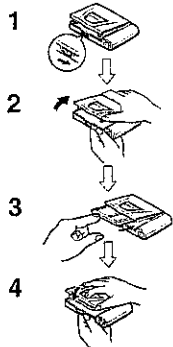
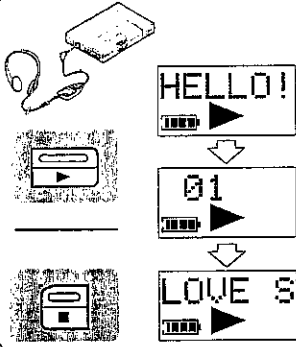
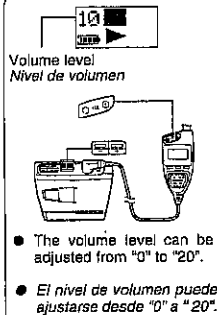
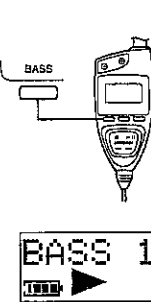
Display	Meaning	Remedy
No DISC	● A disc has not been loaded.	● Load a disc.
E-DISC	● The disc is damaged or the music information is not written properly on the disc.	● Replace the disc.
BLANK	● Nothing is recorded.	● Replace the disc with a recorded disc.
[00]	● Music is not being recorded.	
?DISC	● The data contains an error.	● Replace the disc.
E-TOC E-UTOC	● The disc has a large amount of damage.	
OPEN	● The disc holder has been opened during playback.	● Close the disc holder.
E-TEMP	● The temperature is too high.	● Turn off the power, and wait for a while.
Lo BATT	● The rechargeable battery has run down.	● Charge the rechargeable battery.
HOLD	● The HOLD switch is in the safety position.	● Return the HOLD switch to its original position.
POWER?	● Improper power is being used.	● Use a specified power source.
E-SYS	● The unit is out of order.	● To have it repaired, call 1-800-BE SHARP for the location of your nearest Authorized Service Center.

SHARP

PORTABLE MINIDISC PLAYER
MD-S50Quick-Guide
Guía rápida**AC power**
Alimentación de CAAC 120V, 60Hz
To an AC outlet
120V CA, 60Hz
A un tomacorriente de CA**Rechargeable battery power**
Alimentación de la batería recargable3 AC 120V, 60Hz
To an AC outlet
120V CA, 60Hz
A un tomacorriente de CA

4 Press the ► button, and then press the ■ button to turn off the power.

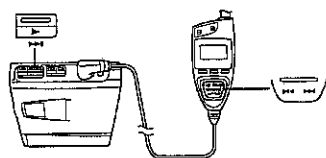
Pulse el botón ►, y luego pulse el botón ■ para desconectar la alimentación.

Playing a MiniDisc
Reproducción de un minidisco**Loading a MiniDisc**
Carga de un minidisco**Playback**
Reproducción**Sound control**
Control del sonido**Volume**
Volumen**Tone**
Tono

- (1) BASS 1
Bass is emphasized a little.
(2) BASS 2
Bass is emphasized more.
(3) BASS 3
Bass is emphasized still more.
(4) BASS 0
Bass emphasis is canceled.

- (1) BASS 1
Los graves se acentúan un poco.
(2) BASS 2
Los graves se acentúan más.
(3) BASS 3
Los graves se acentúan todavía más.
(4) BASS 0
La acentuación de los graves se cancela.

■ APSS
(Auto Program Search System)
■ APSS
(Sistema de búsqueda automática de programas)



To move to the beginning of the next track:
Press the ► button during playback.
To re-start the track being played:
Press the ◀ button during playback.

Para pasar al principio de la pista siguiente:
Pulse el botón ► durante la reproducción.
Para reiniciar la pista que se está reproduciendo:
Pulse el botón ◀ durante la reproducción.

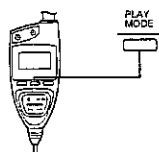
Important

- Do not wear your headphones when you are crossing streets or near traffic.
- Do not use your headphones while driving a motor vehicle, it may create a dangerous traffic hazard and may be illegal. Remember to obey all of the safety rules in your area.
- Do not play the unit at a high volume. Hearing experts advise against extended play at high volume levels.
- If you experience ringing in your ears, reduce the volume or discontinue use.

Importante

- No se ponga auriculares cuando atraviese calles ni cuando esté cerca del tráfico.
- No emplee los auriculares mientras conduce un vehículo, porque puede crear situaciones peligrosas en el tráfico y puede ser ilegal. Recuerde que debe respetar las reglas de seguridad de su zona.
- No reproduzca sonido en el aparato a altos niveles de volumen. Los expertos dicen que es perjudicial la reproducción continuada a altos niveles de volumen.
- Si nota timbres en los oídos, reduzca el volumen o no utilice el aparato.

■ Random play or Repeat play
■ Reproducción aleatoria o reproducción repetida



During playback or while in the stop mode, press the PLAY MODE button repeatedly to select the playback mode.

- RANDOM Random play
Repeat play of all of the tracks
No display Normal playback

Durante la reproducción o en el modo de parada, pulse repetidamente el botón PLAY MODE para seleccionar el modo de reproducción.

- RANDOM Reproducción aleatoria
Reproducción repetida de todas las pistas
Sin visualización Reproducción normal

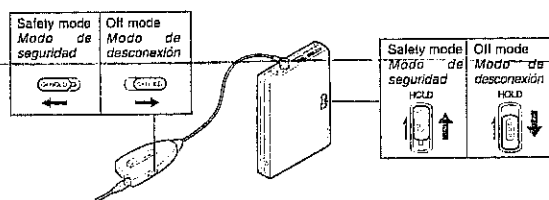
Volume setting

Reduce the volume before starting to play. MiniDiscs, compared to ordinary cassette tapes, have very little noise. If the volume is adjusted according to your usual expectations of noise, you may damage your hearing due to the high volume.

Ajuste del volumen

Reduzca el volumen antes de iniciar la reproducción. Los minidisks, en comparación con las cintas de cassette normales, tienen muy poco ruido. Si se ajusta el volumen de acuerdo con el ruido que puede esperarse normalmente, podría dañarse los oídos debido al alto volumen.

■ Hold function
■ Función de retención



DISASSEMBLY

Caution on Disassembly

Follow the below-mentioned notes when disassembling the unit and reassembling it, to keep it safe and ensure excellent performance:

1. Remove the battery from the MD unit, and take out mini-disc.
2. When assembling the MD unit after repair, be sure to restore correctly the wiring.
The fixing screws are small in size. If any screw is fitted in unspecified position, malfunction may occur.
3. When repairing, pay due attention to static electricity which affects adversely ICs.

STEP	REMOVAL	PROCEDURE	FIGURE
1	Disc Lid	1. Open the disc lid. 2. Screw (A1) x3 3. Pin (A2) x1	7-1
2	Bottom Cover	1. Screw (B1) x5	7-2
3	Main PWB	1. Battery Lid (C1) x1 2. Screw (C2) x1 3. Flexible PWB (C3) x2	7-3

Caution:

Handle carefully the main PWB and flexible PWB.
After removing the flexible PWB (*1) for optical pickup from the connector, wrap the front end of flexible PWB in conductive aluminum foil so as to protect the optical pickup from electrostatic damage.

STEP	REMOVAL	PROCEDURE	FIGURE
4	Mechanism Unit	1. Raise the rear side, and remove in the arrow direction.	7-4
5	Disc Holder	1. Axis (D1) x2	7-5

Cares when assembling

1. When fitting the mechanism unit into the center cabinet, engage the rib of center cabinet with the hook of mechanism unit (see Figure 7-4), insert the part A and part B of lever of center cabinet into the hole of disc holder (see Figure 7-5) and between the disc holder and the mechanism unit, respectively.
At this time take care since the rubber vibration insulator provided at the cabinet side may come off.

2. Bend the flexible PWB toward the main PWB side so that it does not protrude at the cabinet side. (See Figure 7-3.)

3. When installing the bottom lid, align the HOLD knob with the HOLD switch position. After installing make sure that the HOLD switch operates normally.

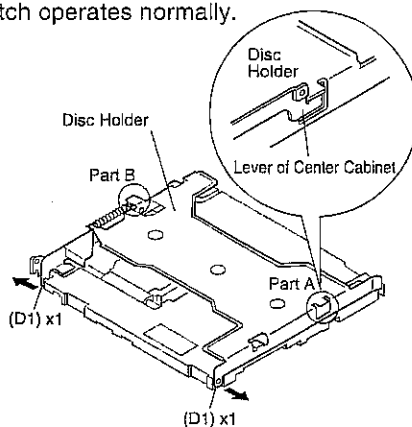


Figure 7-5

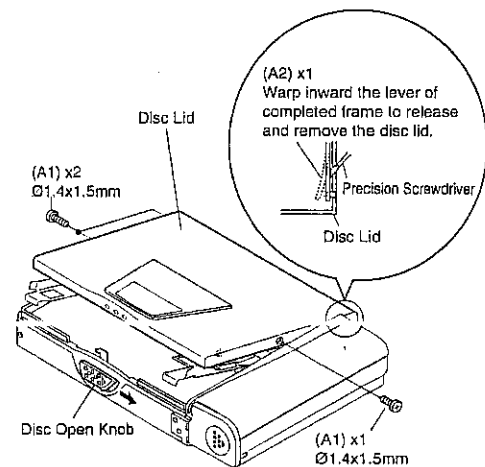


Figure 7-1

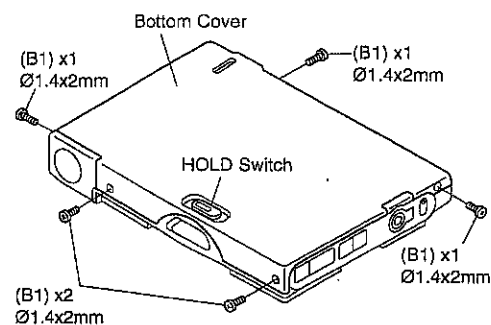


Figure 7-2

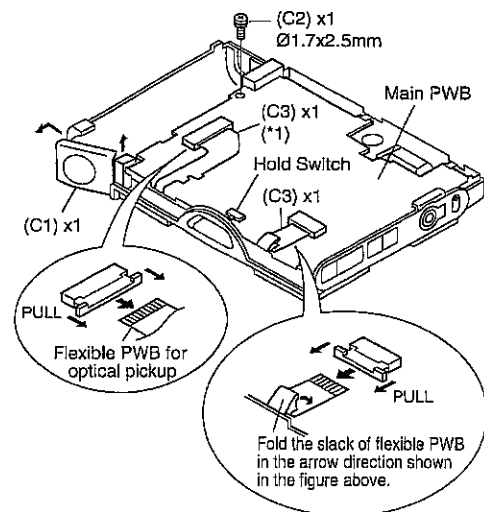


Figure 7-3

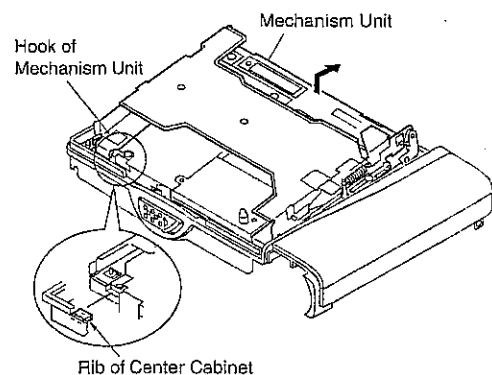


Figure 7-4

REMOVING AND REINSTALLING THE MAIN PARTS

Remove the mechanism according to the disassembling methods 1 to 5. (See Page 7.)

How to remove the turntable (See Figure 8-1.)

1. Remove the fixing washer (A1) x 1 pc. with the small precision screwdriver, and remove the turntable (A2) x 1 upward.

One washer exists between the turntable and the main chassis. Be sure to fit it in specified position.

Caution:

- The wiring core is bonded to the main chassis. It cannot be removed even when soldering joint is removed.
- If the fixing washer was deformed or damaged, replace it with new one.

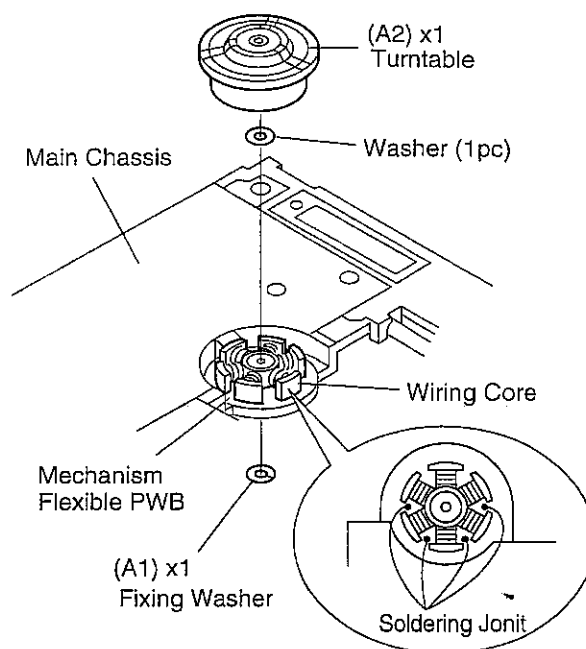


Figure 8-1

How to remove the slide motor (See Figure 8-2.)

1. Remove the screw (B1) x 1 pc.
2. Remove the soldering joint [(B2) x 2 places] of slide motor terminal, and remove the slide motor.

Caution:

Take care so that the motor gear is not damaged.
(Damage of gear causes noising during search.)

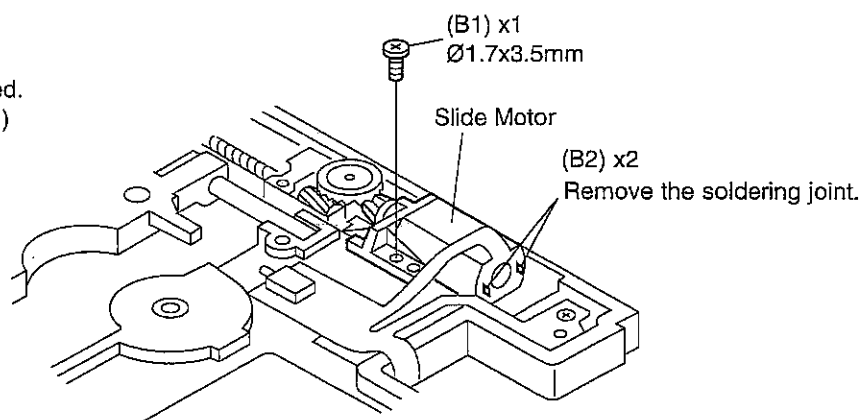


Figure 8-2

How to remove the optical pickup (See Figure 8-3)

1. Remove the screw (C1) x 2 pcs.
2. Slowly raise the optical pickup.

Caution:

Take care so that the motor gear is not damaged.
(Damage of gear causes noising during search.)

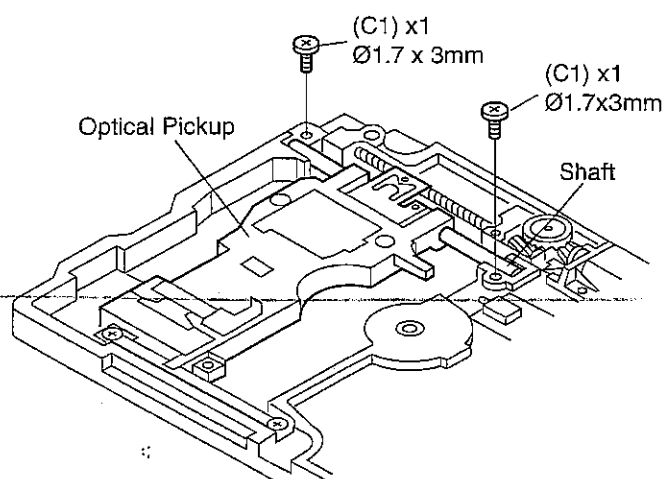


Figure 8-3

ADJUSTMENT

Test disc

MD adjustment needs two types of disc, namely disc for recording (low reflection disc) and playback-only disc (high reflection disc).

	Type	Test disc	Parts No.	Price Code
1	High reflection disc	TGYS1 (SONY)	RRCDT0101AFZZ	CB
2	Low reflection disc	Recording minidisc	UDSKM0001AFZZ	AZ

Caution:

- Use the low reflection disc on which music has been recorded.

How to enter the TEST mode (in Standby state or Power-Off state)

- ① Holding down the Fast/Forward button and BASS button of remote controller, press the Play/Pause button.
- ② Charge control "ON"
- ③ Microcomputer version display for one second "oooooO"
ooooo : Microcomputer ROM version
O : E²PROM version
- ④ All the LCDs light for 2 seconds.
- ⑤ TEST mode stop "_TEST_"

* When the Play/Pause button is pressed while ③ or ④ is displayed, the TEST mode stopstate is set.

* When the Stop/Power Off button is pressed while ③ or ④ is displayed, the E²PROM rewrite-enable area is updated, and the standby state is set.

How to cancel the TEST mode

- ① In TEST mode stop state, during version display or during lighting of all LCDs, press the Stop/Power Off button.
- ② Initialization of normal mode setting
(BASS setting, VOL setting, etc.)
- ③ Updating of E²PROM rewrite-enable area, adjustment and error setting (to adjust all the items when power is turned on in the normal mode).
- ④ Change to standby state

TEST mode

1. AUTO Mode	• Automatic adjustment is performed. (After adjustment the grating adjustment mode is set.) • Continuous playback is performed. (Error rate display, jump test) • Temperature correction is performed only in case of servo start. Posture correction is not performed.
2. RESULT Mode	• Adjustment value is displayed. • Adjustment value is changed manually (in servo OFF state).
3. MANUAL Mode	• Temperature is displayed (updated in real time) • Seeing the displayed measured value/adjustment value, adjust manually. • Continuous playback is performed. (Error rate display, jump test) • Temperature correction is performed only in case of servo start. Posture correction is not performed.
4. INNER Mode	• Determine the position where the INNER switch is turned on. • Temperature correction is performed only in case of servo start. Posture correction is not performed.
5. NORMAL Mode	• After satisfactory completion of adjustment the mode is switched from the TEST mode to the NORMAL mode. • In the NORMAL mode the internal operation mode and memory capacity are displayed. • In the NORMAL mode both temperature correction and posture correction are performed.
6. Error data display Mode	• Error information is displayed. • Error information is initialized.
7. TEST/PLAY Mode	• Continuous playback from the specified address is performed. • 1 line, 10 lines or 400 lines manual jump is performed. • C1 error rate display (pit section), ADIP error rate display (groove section) • Temperature correction is performed only in case of servo start. Posture correction is performed during continuous playback.
8. Battery voltage measurement mode	• Voltage of external/internal battery is measured and displayed.
9. E ² -PROM setting mode	• After replacing E²PROM be sure to set values in E²PROM (Unless setting is made, ROM does not operate.)

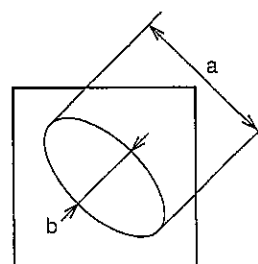
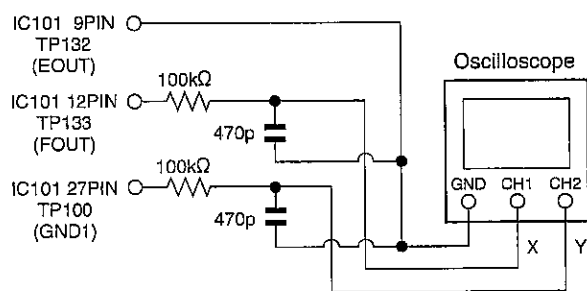
1. AUTO Mode

Step No.	Operation and state	Display
Step 1	TEST mode stop state	[_TEST_]
Step 2	BASS button	
Step 3	AUTO menu mode	[_AUTO_]
Step 4	Play/Pause Button → Move of slide to innermost periphery	
Step 5	Automatic adjustment	[+*○○●●]
Step 6	Completion of adjustment	
Step 7	If adjustment is OK, the next step is (8). If adjustment is NG, the next step is (13).	
Step 8	Grating adjustment	[ADJ. OK]
Step 9	When the Play/Pause button was pressed, the next step is (10). When the Stop/Power Off button was pressed, the next step is (12).	[SQ □□□□] [AP □□□□]
Step 10	Continuous playback (pit section) Continuous playback (group section)	
Step 11	Stop/Power Off button	
Step 12	TEST mode stop state	[_TEST_]
Step 13	Servo OFF	[ADJ. NG]
Step 14	Stop/Power Off button	
Step 15	TEST mode stop state	[_TEST_]

- When the Stop/Power Off button is pressed while the AUTO menu is displayed or during automatic adjustment, the TEST mode stop state is set.
- The operation during continuous playback is explained in [TEST-PLAY MODE].
- Adjustment NG: TEO or FEO measured value is out of range, focus ON is disabled, adjustment error occurs, or TZC error occurs.
- When the high reflection disc is used, ** changes as follows:
TEO → FEO → hf → Hg → Hb → Hf
- When the low reflection disc is used, ** changes as follows:
TEO → FEO → lf → Lg → Lb → Lf → Gl → Gg → Gb → Lf
- Grating adjustment: Focus servo and spin servo ON state
- *** : Adjustment name
- ○○ : Measured value
- ●● : Set value
- □□□□ : Address

Verification of grating adjustment

On Step (8) connect the oscilloscope to the test pin, and verify the EOUT vs. FOUT Lissajous's waveform (X-Y).



Lissajous's waveform
 $a:b \leq 3:1$

Figure 10

2. RESULT Mode

Step No.	Operation and state	Display
Step 1	Test mode STOP state	[_TEST_]
Step 2	BASS button	
Step 3	AUTO menu mode	[_AUTO_]
Step 4	Press Fast Forward button twice (or press Fast Reverse button 6 times)	
Step 5	RESULT menu mode	[RESULT]
Step 6	Play/Pause button	
Step 7	Measured value display Tracking error offset	[TEO: ○○]
Step 8	Fast Forward button	
Step 9	Measured value display Focus error offset	[FEO: ○○]
Step 10	Fast Forward button	
Step 11	Set value display: High reflection focus gain	[Hf__ ●●]
Step 12	Fast Forward button	
Step 13	Set value display: High reflection pit tracking gain	[Hg__ ●●]
Step 14	Fast Forward button	
Step 15	Set value display: High reflection tracking balance	[Hb__ ●●]
Step 16	Fast Forward button	
Step 17	Set value display: Low reflection focus gain	[Lf__ ●●]
Step 18	Fast Forward button	
Step 19	Set value display: Low reflection pit tracking gain	[Lg__ ●●]
Step 20	Fast Forward button	
Step 21	Set value display: Low reflection pit tracking balance	[Lb__ ●●]
Step 22	Fast Forward button	
Step 23	Set value display: Low reflection total signal level	[Gl__ ●●]
Step 24	Fast Forward button	
Step 25	Set value display: Low reflection group tracking gain	[Gg__ ●●]
Step 26	Fast Forward button	
Step 27	Set value display: Low reflection group tracking balance	[Gb__ ●●]
Step 28	Stop/Power Off button	
Step 29	TEST mode stop state	[_TEST_]

- When the Fast Reverse button is pressed, motion direction is reversed.
- When the VOL+ button is pressed while the set value is displayed, the set value grows, and a new set value is stored in RAM.
- When the VOL- button is pressed while the set value is displayed, the set value reduces, and a new set value is stored in RAM.
- When the VOL+ or VOL- button is held down, the set value changes continuously with a 100 ms cycle.
- When the Stop/Power Off button is pressed in the RESULT menu mode, or while measured value or set value is displayed, the TEST mode stop state is set.
- ○○ : Measured value
- ●● : Set value

3. MANUAL Mode

Step No.	Operation and state	Display
Step 1	Test mode STOP state	[_TEST_]
Step 2	BASS button	
Step 3	AUTO menu mode	[_AUTO_]
Step 4	Once press Fast Forward button (or press Fast Reverse button 7 times)	
Step 5	MANUAL menu mode	[MANUAL]
Step 6	Play/Pause button	
Step 7	Temperature measurement	[TMP:◆◆]
Step 8	Fast Forward button	
Step 9	Tracking error offset measurement	[TEO:○○]
Step 10	Fast Forward button	
Step 11	Focus error offset measurement	[FEO:○○]
Step 12	Fast Forward button → Laser lighting	[LON: _ _]
Step 13	Fast Forward button → Move of slide to innermost periphery	
Step 14-a	Focus gain coarse adjustment (high reflection)	[hf:○○●●]
Step 14-b	Focus gain coarse adjustment (low reflection)	[lf:○○●●]
Step 15	Fast Forward button	
Step 16-a	Pit: Tracking fine adjustment (high reflection)	[Hg:○○●●]
Step 16-b	Pit: Tracking fine adjustment (low reflection)	[Lg:○○●●]
Step 17	Fast Forward button	
Step 18-a	Pit: Tracking balance adjustment (high reflection)	[Hb:○○●●]
Step 18-b	Pit: Tracking balance adjustment (low reflection)	[Lb:○○●●]
Step 19	Fast Forward button	
Step 20-a	Focus gain fine adjustment (high reflection)	[Hf:○○●●]
Step 20-b	Focus gain fine adjustment (low reflection)	[Lf:○○●●]
Step 21	When the Fast Forward button is pressed, the next step is (24). When the Play/pause button is pressed, the next step is (22).	
Step 22	Continuous playback of pit section	[SQ:□□□□]
Step 23	When the PLAY MODE button is pressed, the next step is (20-a) or (20-b).	
Step 24	The high reflection disc is not accepted. When the low reflection disc is used, the next step is (25).	
Step 25	TOTAL signal level adjustment	[GI:○○●●]
Step 26	Fast Forward button	
Step 27	Group: Tracking gain adjustment	[Gg:○○●●]
Step 28	Fast Forward button	
Step 29	Group: Tracking balance adjustment	[Gb:○○●●]
Step 30	Fast Forward button	
Step 31	Focus gain fine adjustment	[Lf:○○●●]
Step 32	Play/Pause button	
Step 33	Continuous playback of group section	[AP:□□□□]
Step 34	When the PLAY MODE button is pressed, the next step is (31).	

- When the Fast Reverse button is pressed, the motion direction is reversed.
- When the VOL+ button is pressed during adjustment, the set value grows, and a new set value is output.
- When the VOL- button is pressed during adjustment, the set value reduces, and a new set value is output.
- When the VOL+ or VOL- button is held down, the set value changes continuously with a 100 ms cycle.
- When the Stop/Power Off button is pressed in the MANUAL menu mode, during measurement or adjustment, the TEST mode stop state is set.

- The operation during continuous playback is explained in [TEST-PLAY MODE].

- ○○○○ : Measured value
- ●●●● : Set value
- □□□□ : Address
- ◆◆◆◆ : Temperature code

Jitter adjustment

Connect the jitter meter to the test pin during continuous playback of No.22 and No.33, and adjust VR101 (focus balance) to get the best jitter point.

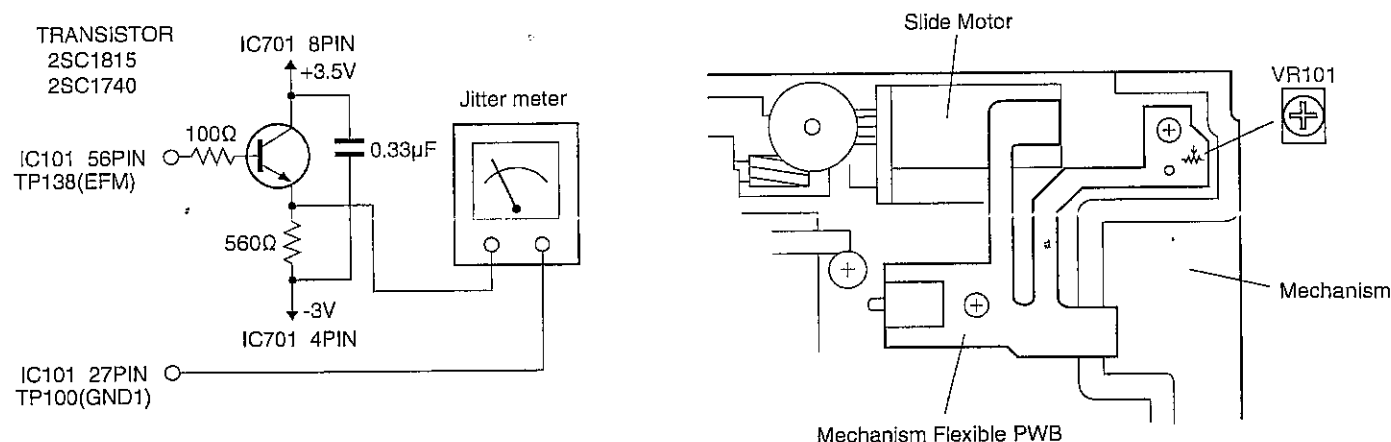


Figure 13-1

4. INNER Mode

Step No.	Operation and state	Display
Step 1	Test mode STOP state	[_TEST_]
Step 2	BASS button	
Step 3	AUTO menu mode	[_AUTO_]
Step 4	Press Fast Forward button 4 times (or press Fast Reverse button 4 times)	
Step 5	INNER menu mode	[INNER_]
Step 6	Play/Pause button	
Step 7	INNER switch position measurement	[SQ □□□□]
Step 8	Stop/Power Off button	
Step 9	TEST mode stop state	[_TEST_]

- When the Stop/Power Off button is pressed in the INNER menu mode, the TEST mode stop state is set.
- □□□□ : Address

Lead-in switch position adjustment

Caution:

Fix the position of lead-in switch in SQ FF93 to FFE3.

Pressing the lead-in switch (SW901) in the arrow direction, retighten the adjusting screw, and then check the position of lead-in switch again.

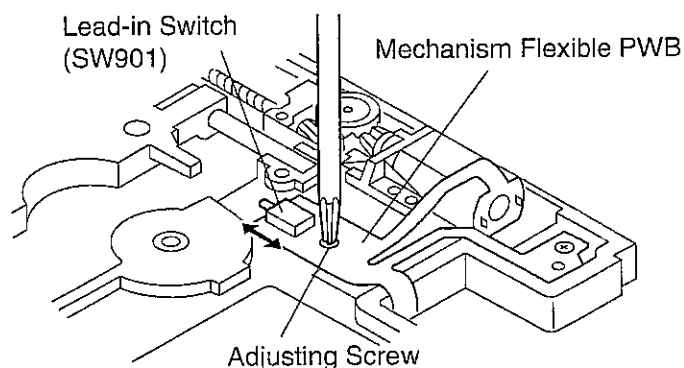


Figure 13-2

5. NORMAL Mode

Step No.	Operation and state	Display
Step 1	Test mode STOP state	[_TEST_]
Step 2	BASS button	
Step 3	AUTO menu mode	[_AUTO_]
Step 4	Press Fast Forward button 5 times (or press Fast Reverse button 3 times)	
Step 5	NORMAL menu mode	[NORMAL]
Step 6	Play/Pause button	
Step 7	TOC lead	Refer to the description given.
Step 8	Hereafter the operation is performed in the NORMAL mode.	

- When the Stop/Power Off button is pressed in the NORMAL menu mode, the TEST mode stop state is set.
- The display which appears during operation is [] (mode, servo state, address display). Only while the DISPLAY button is held down, " *** _ " (TNO, memory capacity display) appears.
- : Internal mode
- : Servo state
(#3: Slide, #2: Tracking, #1: Spin, #0: Focus)
- : Address
- : TNO
- : Memory capacity (sector)
- Selection of VOL, BASS, etc. is enabled (without display)

6. Error data display Mode

Step No.	Operation and state	Display
Step 1	Test mode STOP state	[_TEST_]
Step 2	BASS button	
Step 3	AUTO menu mode	[_AUTO_]
Step 4	Press Fast Forward button 6 times (or press Fast Reverse button 2 times)	
Step 5	Error data display menu mode	[E_DATA]
Step 6	Play/Pause button	
Step 7	Error data 0 display	[E0 _]
Step 8	Fast Forward button	
Step 9	Error data 1 display	[E1 _]
Step 10	Fast Forward button	
Step 11	Error data 2 display	[E2 _]
Step 12	Fast Forward button	
Step 13	Error data 3 display	[E3 _]
Step 14	Fast Forward button	
Step 15	Error data 4 display	[E4 _]
Step 16	Fast Forward button	
Step 17	Error data 5 display	[E5 _]
Step 18	Fast Forward button	
Step 19	Error data 6 display	[E6 _]
Step 20	Fast Forward button	
Step 21	Error data 7 display	[E7 _]
Step 22	Fast Forward button	
Step 23	Error data 8 display	[E8 _]
Step 24	Fast Forward button	
Step 25	Error data 9 display	[E9 _]
Step 26	Stop/Power Off	
Step 27	Test mode STOP state	[_TEST_]

- When the Fast Reverse button is pressed, the motion direction is reversed.
- When the Stop/Power Off button is pressed in the error data display menu mode or while error data is displayed, the TEST mode stop state is set.
- Error data 0 represents the latest error.
- Error which occurred in the TEST mode is also stored in the memory.
- When the DISPLAY button is pressed in the error data display menu mode, the error data is initialized.
[CLEAR]
- : Error code

Error codes list

Code	Description
11	Automatic adjustment: Gain maximum or adjustment failure judgment is NG in TG or FG adjustment retry.
12	Automatic adjustment: Out of allowable range
13	Automatic adjustment: Servo retry error (4 times) during adjustment
16	Automatic adjustment: TZC error in TG or TB adjustment (TG or TB measured value does not change)
17	Automatic adjustment: TEO or FEO allowable range error
21	Focus lead-in disabled
23	Track search time-over
32	P-TOC read disabled
42	U-TOC read disabled
71	Pickup position initialization error (the INNER switch fails to be turned on)
72	E ² PROM read error
82	Overvoltage detected
91	TEMP over

7. TEST/PLAY Mode

Step No.	Operation and state	Display
Step 1	TEST mode stop state	[_TEST_]
Step 2	BASS button	
Step 3	AUTO menu mode	[_AUTO_]
Step 4	Press Fast Forward Forward button 3 times (or Fast Reverse button 5 times)	
Step 5	TEST-PLAY menu mode	[T_PLAY]
Step 6	When the DISPLAY button was pressed, the next step is (7). When the Play/Pause button was pressed, the next step is (9).	
Step 7	TEST-PLAY mode	[Ad0032]
Step 8	Play/Pause button	
Step 9	Continuous playback mode (pit section) Continuous playback mode (group section)	[SQ □□□□] [AP □□□□]
Step 10	Stop/Power Off button	
Step 11	TEST mode stop state	[_TEST_]

- When the Stop/Power Off button is pressed in the TEST-PLAY menu mode, TEST-PLAY mode or continuous playback mode, the TEST mode stop state is set.
 - When the Play/Pause button was pressed in the TEST-PLAY menu mode, continuous playback is started from the current pickup position.
 - Whenever the DISPLAY button is pressed in the TEST-PLAY mode, address changes as follows:
0032 → 03C0 → 0700 → 0850 → 0032 → ...
 - The digit which is changed with the Fast/Forward/Fast/Reverse button whenever the BASS key is pressed in the TEST-PLAY mode varies as follows:
003² → 00³2 → 0⁰32 → 003² → ...
 - When the Fast/Forward button is pressed in the TEST-PLAY mode, the digit of address specified by the BASS key is set to [+01h]. (0 to F)
 - When the Fast/Reverse button is pressed in the TEST-PLAY mode, the digit of address specified by the BASS key is set to [-01h]. (0 to F)
 - * When the Fast Forward/Fast Reverse button is held down, change continues with 100 ms cycle.
 - When the BASS key is pressed in the continuous playback mode, the number of JUMP lines changes as follows:
1 line → 10 lines → 400 lines → 1 line ...
 - * After the number of jump lines is displayed for one second, the address display is resumed. [▲▲▲ T R_]
 - When the Fast Forward button is pressed in the continuous playback mode, the specified number of jump lines is jumped in FWD direction.
 - When the Fast Reverse button is pressed in the continuous playback mode, the specified number of jump lines is jumped in REV direction.
 - * When the Fast Forward/Fast Reverse button is held down, jump is repeated with regular intervals of about 100 ms.
 - Whenever the DISPLAY button is pressed in the continuous playback mode, the display changes as follows.
 - * Pit section

Continuous playback (SUBQ address display)	[SQ □□□□]
↓	
Continuous playback (C1 error display)	[CE ☆☆☆☆]
↓	
Continuous playback (SUBQ address display)	[SQ □□□□]
↓	
...	
 - * Group section

Continuous playback (ADIP address display)	[AP □□□□]
↓	
Continuous playback (C1 error display)	[CE ☆☆☆☆]
↓	
Continuous playback (ADIP error display)	[AE ☆☆☆☆]
↓	
Continuous playback (ADIP address display)	[AP □□□□]
↓	
...	
- □□□□ : Address
 • ☆☆☆☆ : C1 error rate
 • ★★★★★ : ADIP error rate
 • ▲▲▲ : Number of jump lines

8. Battery voltage measurement mode

Step No.	Operation and state	Display
Step 1	TEST mode stop state	[_TEST_]
Step 2	Hold down the BASS button for 2 seconds or more.	[x ▲▲ ▼▼]
Step 3	Release the button.	[_TEST_]

- ▲. ▲ : External battery voltage (V)
- ▼. ▼ : Internal battery voltage (V)

9. E²PROM SETTING mode

9.1 Procedure to replace E²PROM and to write the initial value of microcomputer into E²PROM

Step No.	Operation Remarks	
Step 1	Replace E ² PROM.	
Step 2	Remove protection of E ² PROM. [Connect the pin 2 (TP431) and pin 8 (TP432) of E ² PROM.]	
Step 3	Press the Fast Forward button, BASS button and Play/Pause button to enter the TEST mode.	
Step 4	Version display	[*****] Microcomputer ROM version E²PROM version(b~z)
Step 5	All the LCDs light.	
Step 6	TEST mode stop state	[_TEST_]
Step 7	Press the BASS button.	[_AUTO_]
Step 8	Once press the Fast Reverse button (or press the Fast Forward button 7 times).	[EEPROM]
Step 9	Do operation shown in the [E ² PROM SETTING MODE FLOW CHART], compare the indication with the [E ² PROM INFORMATION LIST], and make setting conforming to the [E ² PROM INFORMATION LIST], using the VOL+ and VOL- buttons.	
Step 10	Set the temperature standard value. (Refer to [Temperature Standard Value Setting Procedure].)	
Step 11	Set all the items as stated in the [E ² PROM INFORMATION LIST].	
Step 12	Press the Stop/Power Off button.	[_TEST_]
Step 13	Press the Stop/Power Off button.	
Step 14	After writing data into E ² PROM turn off power supply.	
Step 15	Restore protection of E ² PROM [disconnect the pins connected in step (2) above].	

9.2 Temperature standard value setting procedure (to be executed at room temperature 21 to 29°C)

Step No.	Operation Remarks									
Step 1	TEST mode stop state	[_TEST_]								
Step 2	Measure voltage on the TEMP terminal [pin 3 (TP438)] of microcomputer.									
Step 3	Calculate the temperature standard value, using the following formula: Temperature standard value = (Measured voltage x 256)/2.8									
Step 4	Round down the decimal fraction of calculated temperature standard value, and then convert to hexadecimal value.									
Step 5	Correct temperature value according to the ambient temperature, referring to the following table. An example: Ambient temperature is 22°C, and measured voltage is 1.25V. Temperature standard value = 1.25 x 256/2.8 = 114.286 = 114(round down decimal fraction) = 72H(hexadecimal conversion) <table><tr><th>Ambient temperature (°C)</th><th>Temperature correction (H)</th></tr><tr><td>21~23</td><td>-1</td></tr><tr><td>24~26</td><td>±0</td></tr><tr><td>27~29</td><td>+1</td></tr></table> As ambient temperature is 22°C, the temperature correction is [-1H]. Hence, the temperature standard value to be set in E2PROM is [71H].	Ambient temperature (°C)	Temperature correction (H)	21~23	-1	24~26	±0	27~29	+1	
Ambient temperature (°C)	Temperature correction (H)									
21~23	-1									
24~26	±0									
27~29	+1									
Step 6	Press the BASS button.	[_AUTO_]								
Step 7	Once press the Fast/Reverse button (or press the Fast Forward button 7 times).	[EEPROM]								
Step 8	Press the Play/Pause button.	[Focus_]								
Step 9	Press the Fast Reverse button twice (or press the Fast Forward button 5 times).	[_Temp_]								
Step 10	Press the Play/Pause button.	[TM__○○]								
Step 11	Set the temperature standard value to thus obtained value with the VOL+ and VOL- buttons.									
Step 12	Press the Stop/Power Off button.	[_TEST_]								

○○:Temperature standard value

E²PROM INFORMATION LIST

Focus setting

Item indication	Set value
FG_ _ 00	6CH
FF1_ 00	70H
FF2_ 00	F0H
FF3_ 00	FEH
FF4_ 00	00H
FZH_ 00	13H
FLn_ 00	10H
FLf_ 00	7FH
FPn_ 00	00H
FPf_ 00	88H
FLV_ 00	28H
Wtf_ 00	90H
FSR_ 00	06H

Spin setting

Item indication	Set value
SPG_ 00	1AH
SPi_ 00	D0H
SPm_ 00	A0H
SPo_ 00	6CH
SP1_ 00	08H
SP2_ 00	80H
SP3_ 00	F2H
SP4_ 00	F2H
SP5_ 00	10H

BASS setting

Item indication	Set value
BS1_ 00	00H
BS2_ 00	00H
BS3_ 00	00H

TEMP setting

Item indication	Set value
TM_ _ 00	Calculate values

Tracking setting

Item indication	Set value
TG_ _ 00	50H
TF1_ 00	70H
TF2_ 00	F0H
TFS_ 00	00H
TBo_ 00	40H
TBt_ 00	60H
TKo_ 00	48H
TKt_ 00	28H
TDo_ 00	75H
TDt_ 00	1AH
SCo_ 00	00H
SCt_ 00	40H
SCm_ 00	53H
DBO_ 00	00H
CHp_ 00	10H
CLp_ 00	F0H
CHr_ 00	20H
CLr_ 00	E0H
WTm_ 00	90H

Slide setting

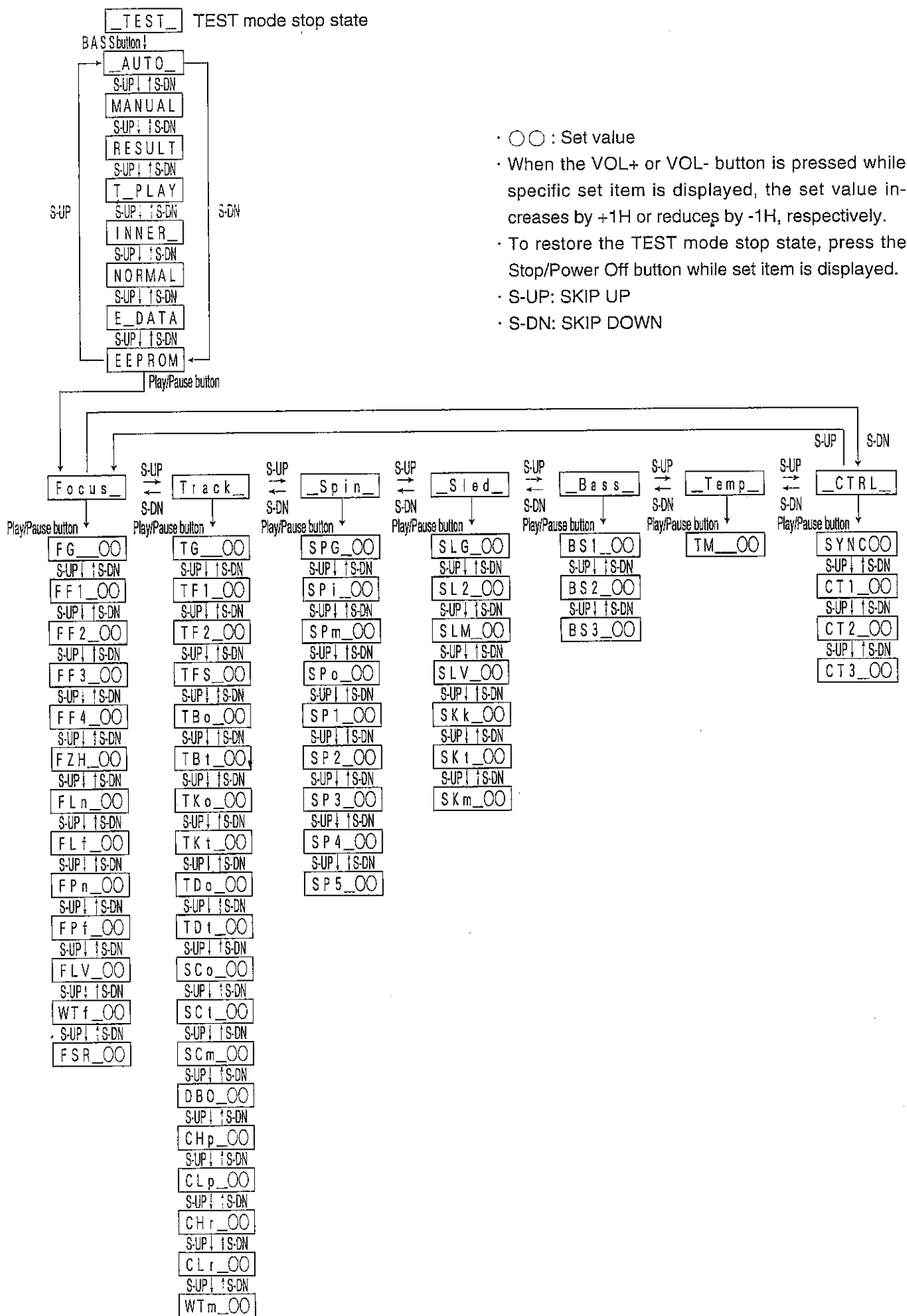
Item indication	Set value
SLG_ 00	80H
SL2_ 00	1CH
SLM_ 00	7FH
SLV_ 00	20H
SLk_ 00	78H
SLt_ 00	50H
SLm_ 00	78H

Control setting

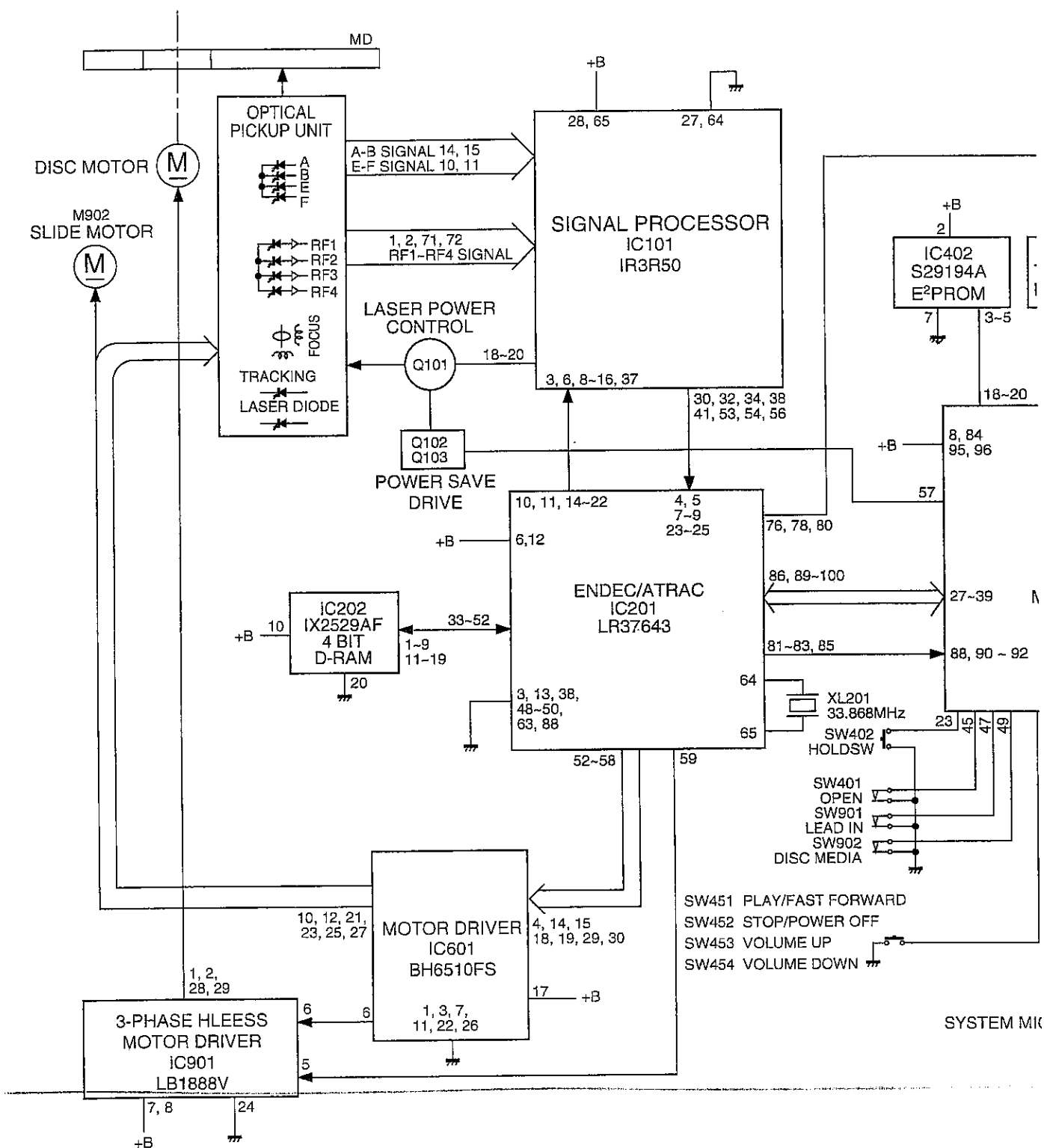
Item indication	Set value
SYNC 00	A8H
CT1_ 00	53H
CT2_ 00	A8H
CT3_ 00	01H

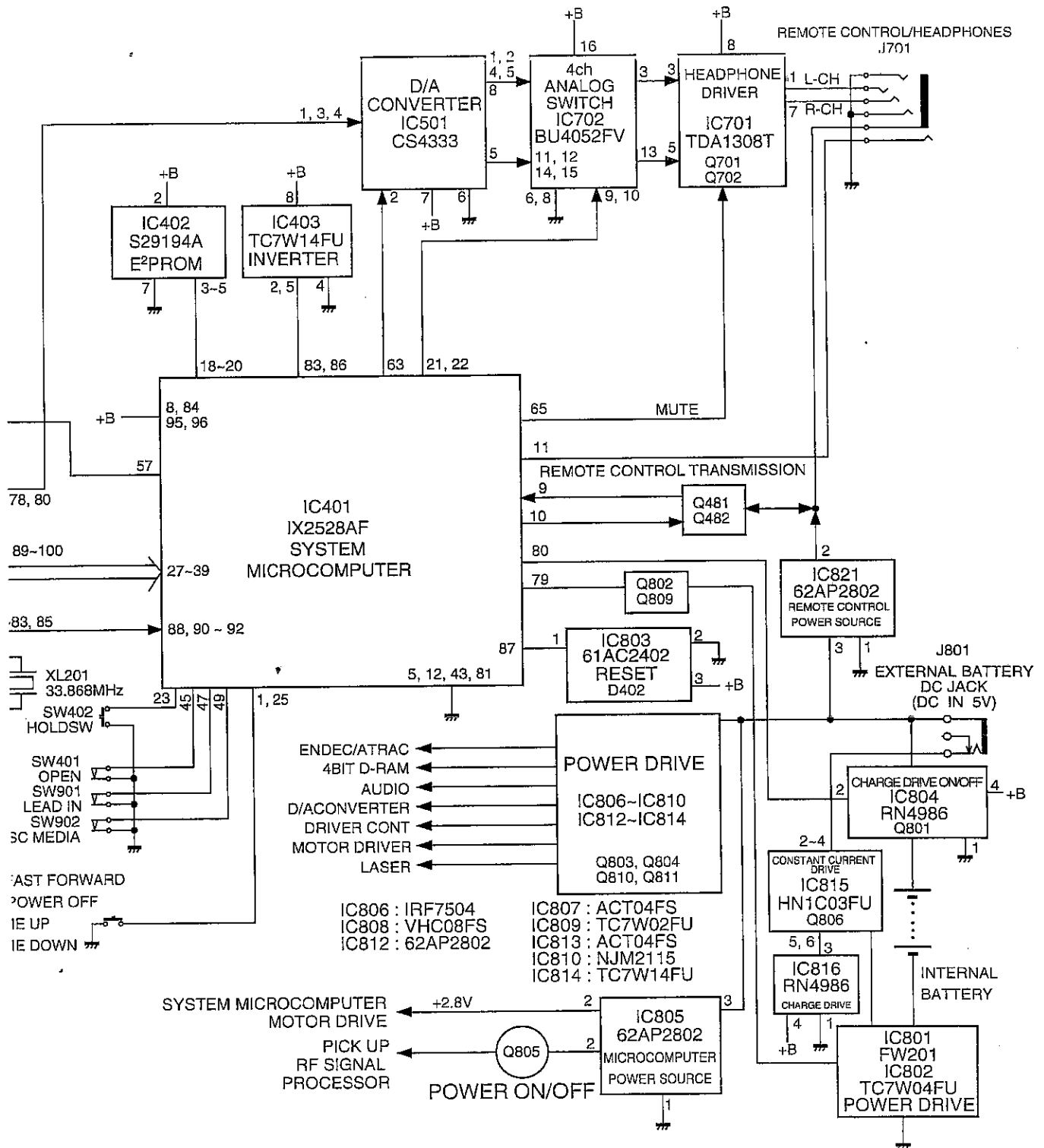
00 : Set value

E²PROM PROM SETTING MODE CHANGE CHART



BLOCK DIAGRAM





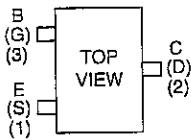
NOTES ON SCHEMATIC DIAGRAM

- Resistor:
To differentiate the units of resistors, such symbol as K and M are used: the symbol K means 1000 ohm and the symbol M means 1000 kohm and the resistor without any symbol is ohm-type resistor. Besides, the one with "Fusible" is a fuse type.
- Capacitor:
To indicate the unit of capacitor, a symbol P is used: this symbol P means micro-micro-farad and the unit of the capacitor without such a symbol is microfarad. As to electrolytic capacitor, the expression "capacitance/withstand voltage" is used.

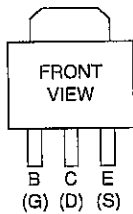
(CH), (TH), (RH), (UJ): Temperature compensation
(ML): Mylar type

- The indicated voltage in each section is the one measured by Digital Multimeter between such a section and the chassis with no signal given.
- Parts marked with "△" (□ □ □ □) are important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

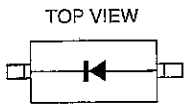
REF. NO	DESCRIPTION	POSITION
SW401	DISC COVER OPEN/CLOSE DELECTION	OFF
SW402	HOLD	OFF
SW451	PLAY	OFF
SW452	STOP/POWER OFF	OFF
SW453	VOLUME +	OFF
SW454	VOLUME -	OFF
SW901	LEAD IN	OFF
SW902	DISC MEDIA	OFF



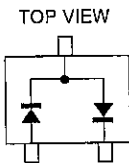
2SA1745
2SA17457
2SK2036
DTA114 TE
DTA123 JE
DTA124 EE
DTC114 EE
DTC144 EE
DTC144 TE



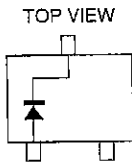
2SD1950
2SK2316



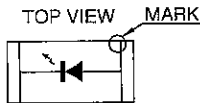
1SS373
1SS368
015Z5.1Y
015Z5.6Z



DA221
1SS372



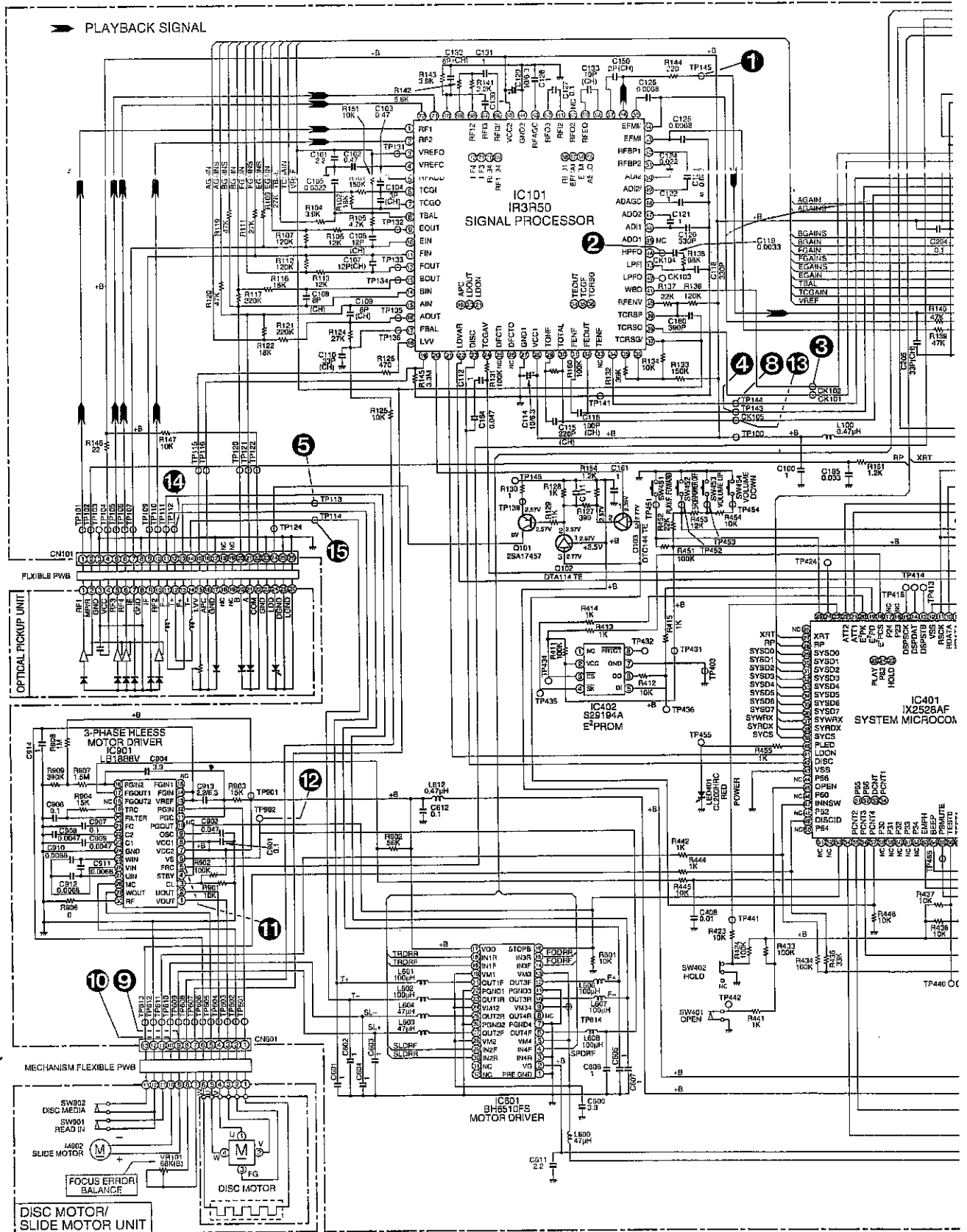
SB10015C



CL200HRC

Figure 22 TYPES OF TRANSISTOR AND LED

SITUATION :



NOTES ON SCHEMATIC DIAGRAM can be found on page 22.

The numbers ① to ⑮ are waveform numbers shown in page 31.

Figure 23 SCHEMATIC DIAGRAM (1/3)

SITUATION :

A

B

C

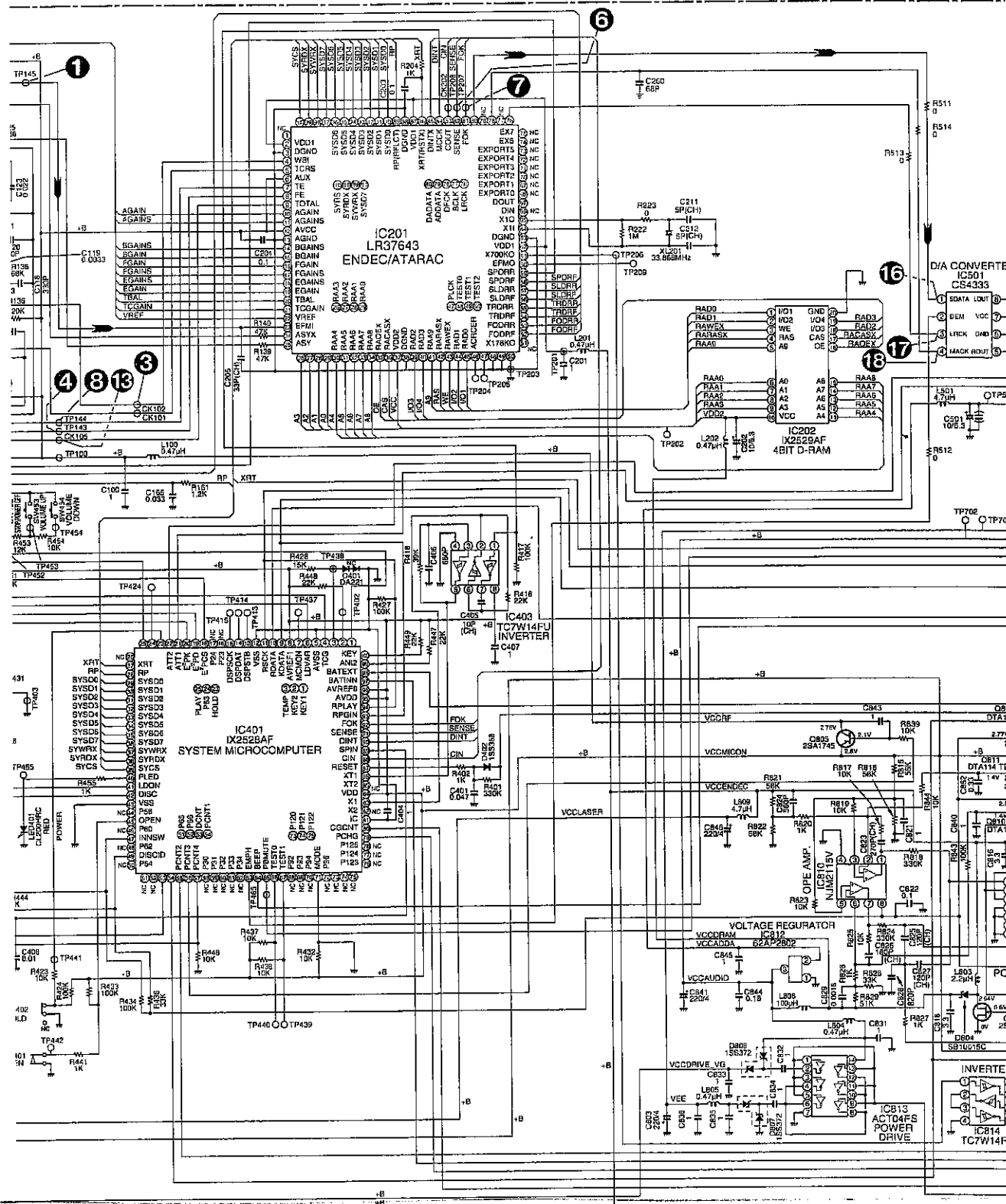
D

E

F

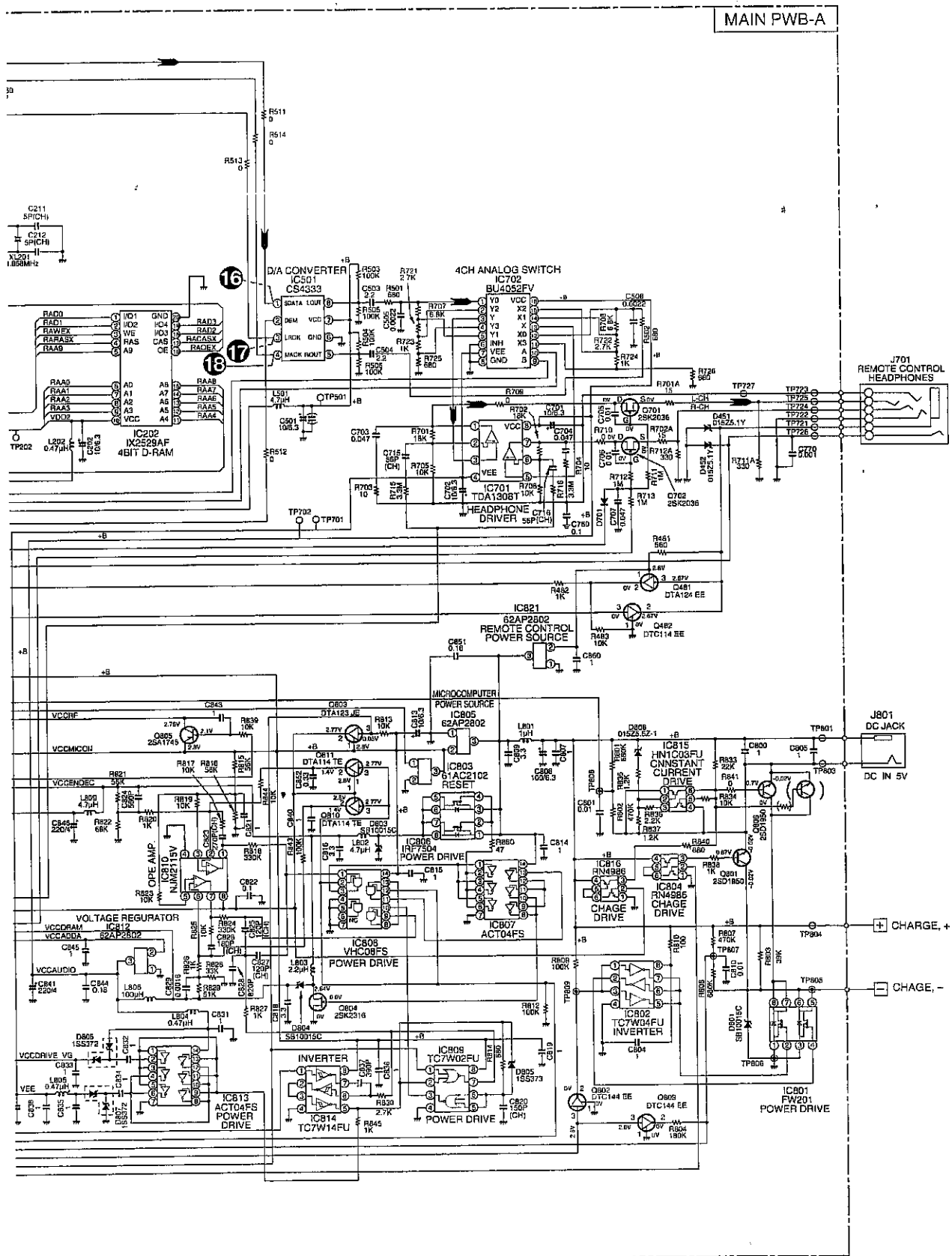
G

H

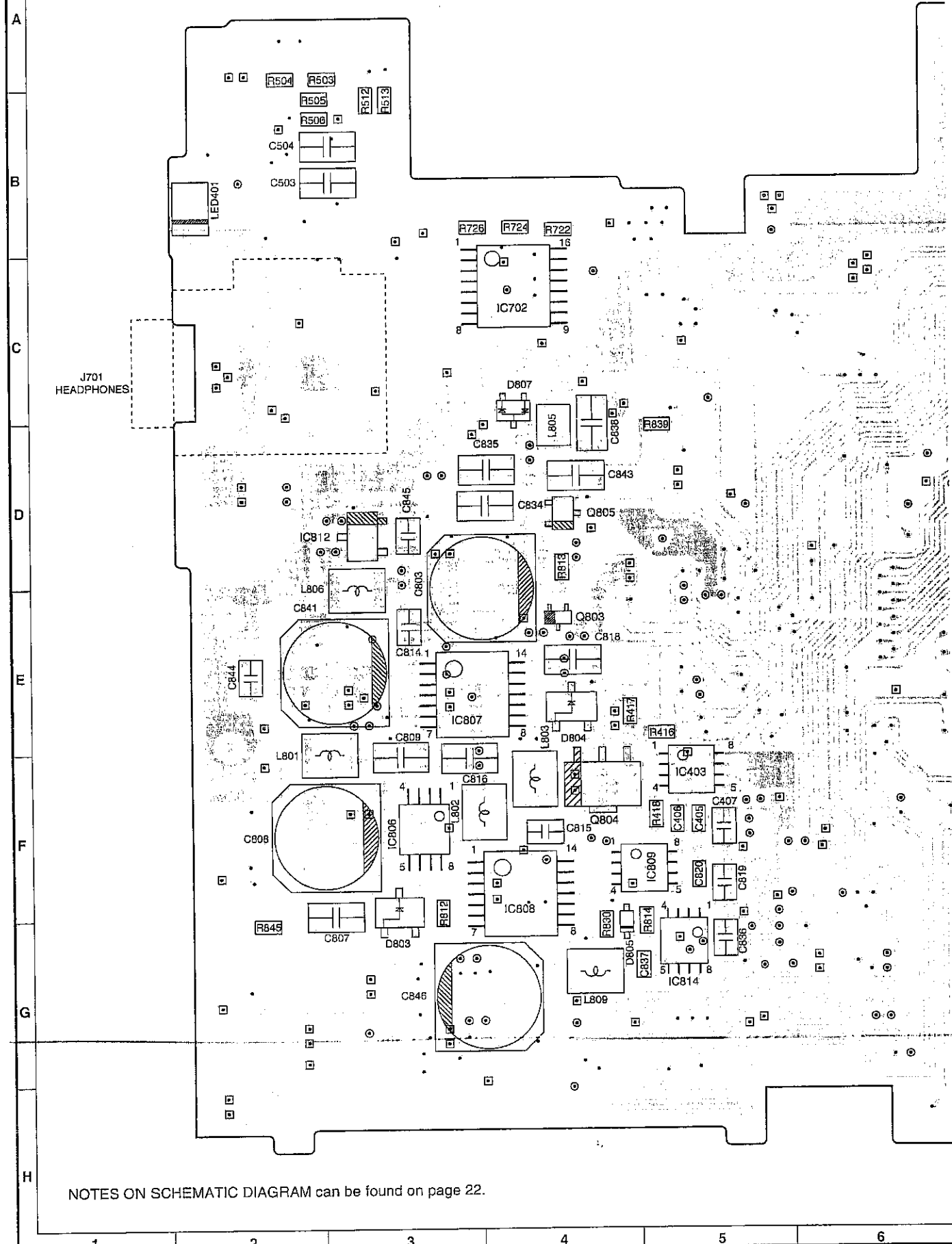


NOTES ON SCHEMATIC DIAGRAM can be found on page 22.

Figure 24 SCHEMATIC DIAGRAM (2/3)

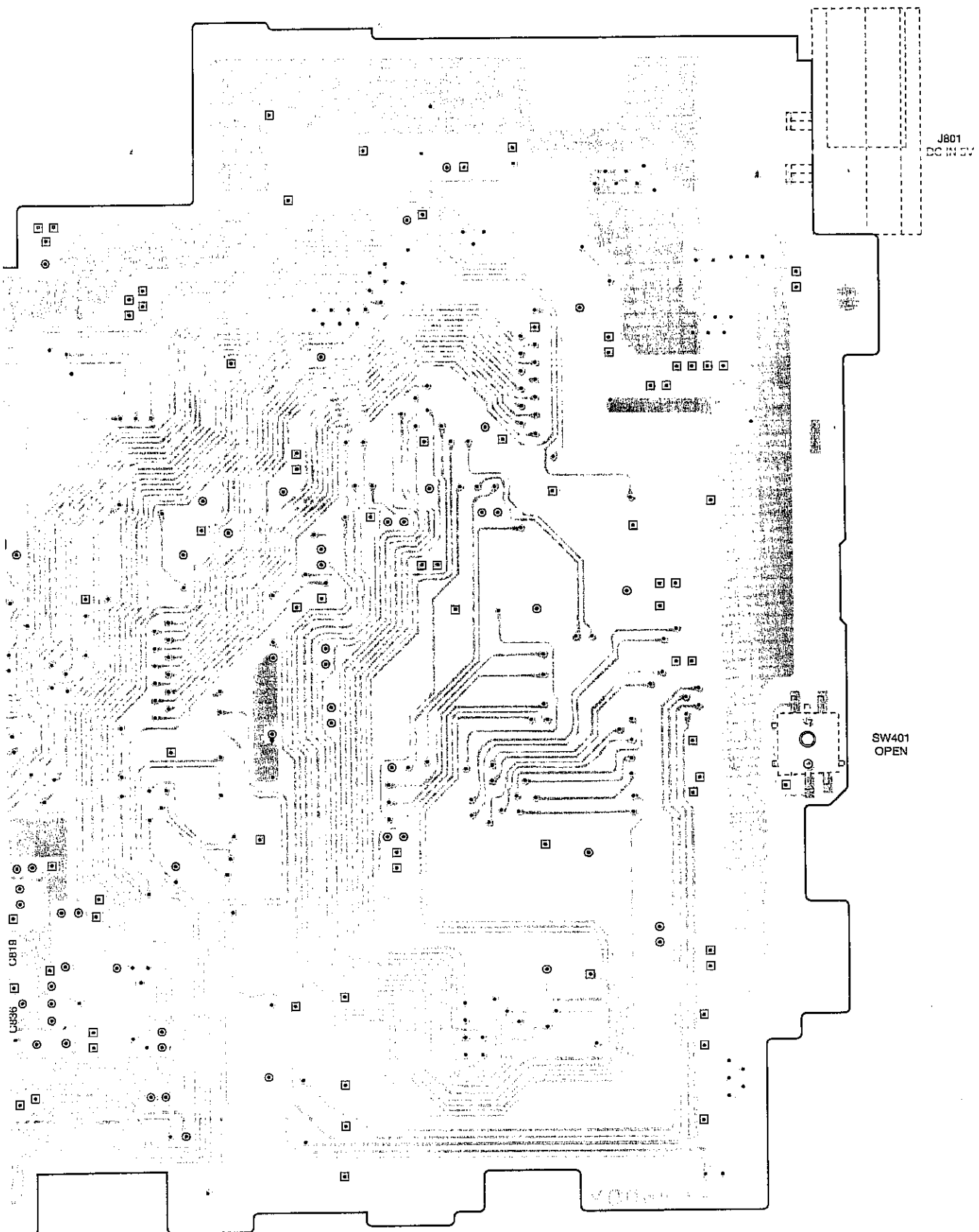
SITUATION : 

MAIN PWB-A(BOTTOM VIEW)



NOTES ON SCHEMATIC DIAGRAM can be found on page 22.

Figure 28 WIRING OF P.W.BOARD (3/4)



The numbers ① to ⑱ are waveform numbers shown in page 31.

7	8	9	10	11	12
---	---	---	----	----	----

Figure 29 WIRING OF P.W.BOARD (4/4)

VOLTAGE

IC101			
PIN NO.	VOLTAGE	PIN NO.	VOLTAGE
1	0.7V	37	1.37V
2	0.7V	38	0V
3	1.37V	39	1.48V
4	1.37V	40	1.25V
5	1.12V	41	0.7V
6	1.37V	42	1.35V
7	1.37V	43	1.37V
8	1.37V	44	1.3V
9	1.37V	45	1.36V
10	1.37V	46	1.37V
11	1.37V	47	1.34V
12	1.37V	48	0.03V
13	1.37V	49	1.18V
14	1.37V	50	1.16V
15	1.37V	51	0.67V
16	1.37V	52	0.67V
17	1.37V	53	1.35V
18	1.37V	54	1.36V
19	1.34V	55	1.67V
20	2.38V	56	1.16V
21	0V	57	1.37V
22	0.02V	58	1.37V
23	0V	59	0V
24	0.06V	60	1.38V
25	1.37V	61	1.37V
26	1.37V	62	1.34V
27	0V	63	0.2V
28	2.75V	64	0V
29	1.37V	65	2.75V
30	0.9V	66	1.2V
31	1.37V	67	1.17V
32	1.34V	68	0.42V
33	1.37V	69	0.03V
34	1.37V	70	0.3V
35	1.37V	71	0.7V
36	1.44V	72	0.7V

IC201			
PIN NO.	VOLTAGE	PIN NO.	VOLTAGE
1	0V	51	1.27V
2	2.55V	52	0V
3	0V	53	0V
4	0.7V	54	0V
5	0V	55	0V
6	2.75V	56	0V
7	1.35V	57	0V
8	1.34V	58	0V
9	0.9V	59	0V
10	1.4V	60	1.16V
11	1.4V	61	1.26V
12	2.75V	62	2.56V
13	0V	63	0V
14	1.4V	64	1.24V
15	1.4V	65	1.24V
16	1.4V	66	-
17	1.4V	67	1.23V
18	1.4V	68	0V
19	1.4V	69	0V
20	1.4V	70	0V
21	1.4V	71	0V
22	1.4V	72	0V
23	1.15V	73	0V
24	1.3V	74	0V
25	1.3V	75	0V
26	0.8V	76	1.27V
27	0.8V	77	1.23V
28	0.65V	78	1.12V
29	1.89V	79	-
30	0.8V	80	0V
31	1.36V	81	2.55V
32	1.11V	82	0V
33	1.36V	83	2.55V
34	1.36V	84	1.05V
35	2.59V	85	2.55V
36	2.88V	86	2.8V
37	3.6V	87	2.56V
38	0V	88	0V
39	1.5V	89	0V
40	2.06V	90	0.2V
41	1.28V	91	0.4V
42	2.48V	92	0.3V
43	3.42V	93	1.75V
44	2.22V	94	2.09V
45	1.3V	95	1.7V
46	2.45V	96	1.9V
47	1.11V	97	0.3V
48	0V	98	2.74V
49	0V	99	2.8V
50	0V	100	0.2V

IC901			
PIN NO.	VOLTAGE	PIN NO.	VOLTAGE
1	0.1V	16	1.48V
2	0.1V	17	0V
3	0.253V	18	0V
4	2.77V	19	0.79V
5	0V	20	0.79V
6	0V	21	0.88V
7	2.8V	22	1V
8	2.8V	23	0.1V
9	1.2V	24	0V
10	2.8V	25	0.1V
11	1.5V	26	0.1V
12	1.46V	27	0.1V
13	1.46V	28	0.1V
14	1.46V	29	0.1V
15	1.46V	30	0V

IC401			
PIN NO.	VOLTAGE	PIN NO.	VOLTAGE
1	2.8V	51	0V
2	2.8V	52	0V
3	1.4V	53	2.77V
4	0V	54	0.04V
5	0V	55	2.8V
6	0V	56	0V
7	2.28V	57	2.77V
8	2.8V	58	0V
9	0V	59	0V
10	0V	60	0V
11	2.72V	61	0V
12	0V	62	0V
13	2.66V	63	2.8V
14	0V	64	2.8V
15	2.75V	65	0V
16	0V	66	2.8V
17	0V	67	2.8V
18	0V	68	0V
19	0V	69	0V
20	0V	70	0V
21	2.8V	71	0V
22	2.8V	72	0V
23	2.8V	73	0V
24	2.8V	74	0V
25	2.8V	75	0V
26	0V	76	0V
27	2.8V	77	0V
28	0V	78	0V
29	0.2V	79	2.8V
30	0.44V	80	2.78V
31	0.3V	81	0V
32	1.75V	82	1.9V
33	2V	83	1.37V
34	1.6V	84	2.8V
35	1.8V	85	2.1V
36	0.3V	86	1.34V
37	2.8V	87	2.71V
38	2.8V	88	2.57V
39	0.1V	89	0.03V
40	2.74V	90	2.55V
41	0V	91	0V
42	0V	92	2.56V
43	0V	93	0.02V
44	0V	94	2.72V
45	0.03V	95	2.8V
46	0V	96	2.8V
47	2.75V	97	1.085V
48	0V	98	1.84V
49	0.08V	99	2.8V
50	0V	100	2.8V

IC402		IC403	
PIN NO.	VOLTAGE	PIN NO.	VOLTAGE
1	-	1	1.05V
2	2.8V	2	1.35V
3	2.8V	3	1.33V
4	0V	4	0V
5	0V	5	1.33V
6	0V	6	1.35V
7	0V	7	1.45V
8	0V	8	2.8V

IC601			
PIN NO.	VOLTAGE	PIN NO.	VOLTAGE
1	0V	17	2.8V
2	7V	18	0V
3	0V	19	0V
4	0V	20	2.57V
5	2.57V	21	0V
6	0V	22	0V
7	0V	23	0V
8	0V	24	2.57V
9	2.57V	25	0V
10	0V	26	0V
11	0V	27	0V
12	0V	28	2.57V
13	2.57V	29	0V
14	0V	30	0V
15	0V	31	-
16	2.77V	32	-

IC202	
PIN NO.	VOLTAGE
1	1.2V
2	2.2V
3	3.58V
4	2.67V
5	1.57V
6	1.89V
7	0.65V
8	0.8V
9	0.8V
10	3.6V
11	0.8V
12	1.36V
13	1.38V
14	1.1V
15	1.1V
16	2.59V
17	2.88V
18	1.4V
19	2V
20	0V

IC501	
PIN NO.	VOLTAGE
1	0V
2	2.8V
3	1.27V
4	1.16V
5	1.35V
6	0V
7	2.76V
8	1.32V

IC701	
PIN NO.	VOLTAGE
1	0V
2	0V
3	0V
4	-2.98V
5	0V
6	0V
7	0V
8	3.48V

IC702	
PIN NO.	VOLTAGE
1	0V
2	0V
3	0V
4	0V
5	0V
6	0V
7	-3V
8	0V
9	2.8V
10	2.8V
11	0V
12	0V
13	0V
14	0V
15	0V
16	3.49V

IC801	
PIN NO.	VOLTAGE
1	0V
2	5V
3	0V
4	0V
5	0V
6	0V
7	0V
8	0V

IC802	
PIN NO.	VOLTAGE
1	0V
2	0V
3	0V
4	0V
5	5V
6	5V
7	5V
8	5V

IC803	
PIN NO.	VOLTAGE
1	2.8V
2	0V
3	2.8V

IC804	
PIN NO.	VOLTAGE
1	0V
2	2.75V
3	1.7V
4	4.8V
5	0.01V
6	0.01V

IC805	
PIN NO.	VOLTAGE
1	0V
2	2.8V
3	5V

IC806	
PIN NO.	VOLTAGE
1	5V
2	3.3V
3	5V
4	3.3V
5	2.87V
6	2.87V
7	2.87V
8	2.87V

IC807	
PIN NO.	VOLTAGE
1	0.87V
2	3.3V
3	5V
4	0.97V
5	3.3V
6	0.97V
7	3.3V
8	0.58V
9	1.24V
10	0.58V
11	1.24V
12	1.24V
13	0.34V
14	5V

IC808	
PIN NO.	VOLTAGE
1	1.13V
2	2.8V
3	1V
4	0V
5	0V
6	0V
7	0V
8	0.34V
9	1.07V
10	1.56V
11	0.34V
12	2.8V
13	0.34V
14	2.8V

IC809	
PIN NO.	VOLTAGE
1	0.04V
2	1.42V
3	1.56V
4	0V
5	1V
6	1V
7	1.37V
8	2.8V

IC810	
PIN NO.	VOLTAGE
1	1.1V
2	1.4V
3	1.4V
4	0V
5	1.4V
6	1.4V
7	0.78V
8	2.77V

IC812	
PIN NO.	VOLTAGE
1	0V
2	2.8V
3	3.5V

IC813	
PIN NO.	VOLTAGE
1	1.4V
2	1.68V
3	1.4V
4	1.68V
5	1.4V
6	1.68V
7	0V
8	1.68V
9	1.4V
10	1.68V
11	1.4V
12	1.68V
13	1.4V
14	3.5V

IC814	
PIN NO.	VOLTAGE
1	1.28V
2	1.4V
3	1.4V
4	0V
5	1.41V
6	1.36V
7	1.41V
8	2.8V

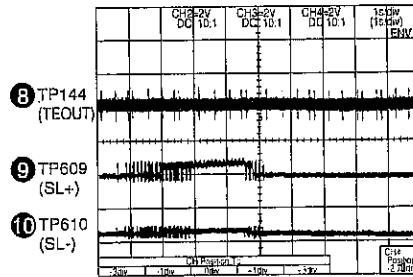
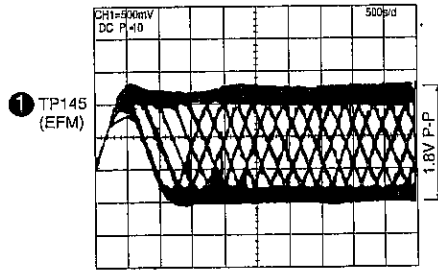
IC815	
PIN NO.	VOLTAGE
1	-0.02V
2	0V
3	-0.02V
4	-0.02V
5	0.58V
6	0.69V

IC816	
PIN NO.	VOLTAGE
1	0V
2	2.77V
3	4.75V
4	4.8V
5	0.01V
6	0.01V

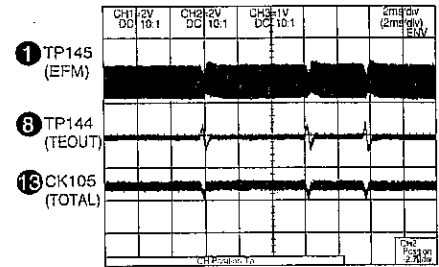
IC821	
PIN NO.	VOLTAGE
1	0V
2	2.8V
3	5V

WAVEFORMS OF CD CIRCUIT

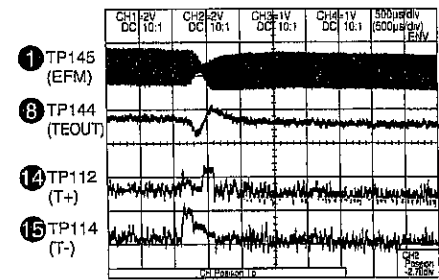
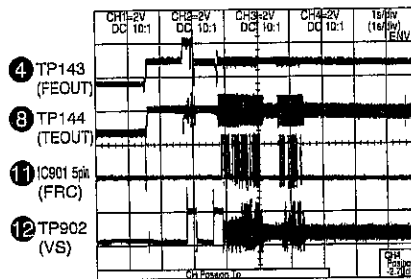
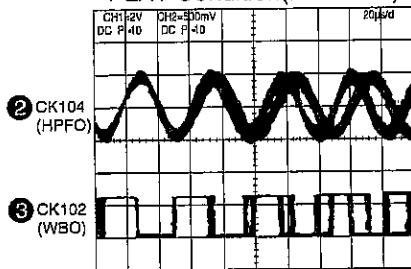
PLAY Condition



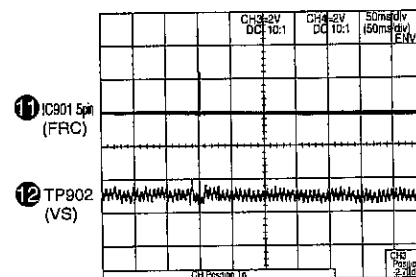
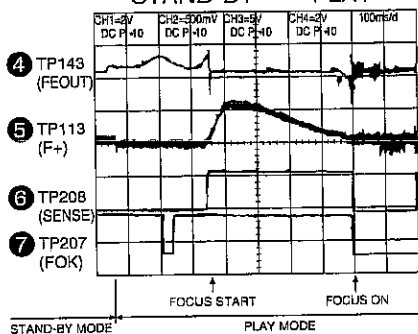
Group



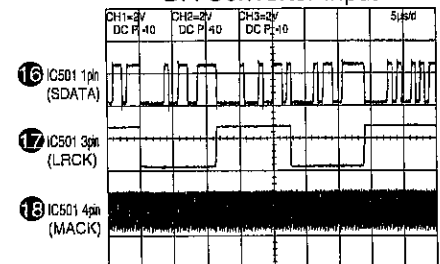
PLAY Condition(MO DISC)



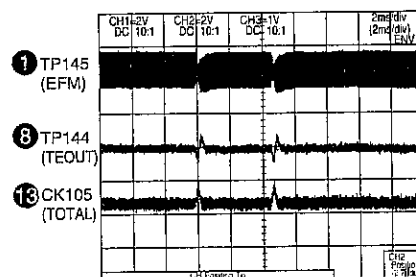
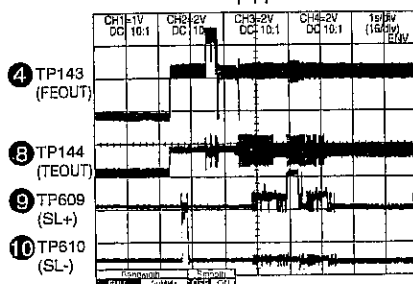
STAND-BY → PLAY



DA Converter Input



PIT



TROUBLESHOOTING

It is advisable to use the TEST mode (refer to Error Data Display Mode, P14) indicating the causes of troubles before starting repair. Causes of operation errors (up to 10 errors) are recorded as error codes. This information is useful for repair.

When does not function

When the CD section does not operate When the objective lens of the optical pickup is dirty, this section may not operate. Clean the objective lens, and check the playback operation. When this section does not operate even after the above step is taken, check the following items.

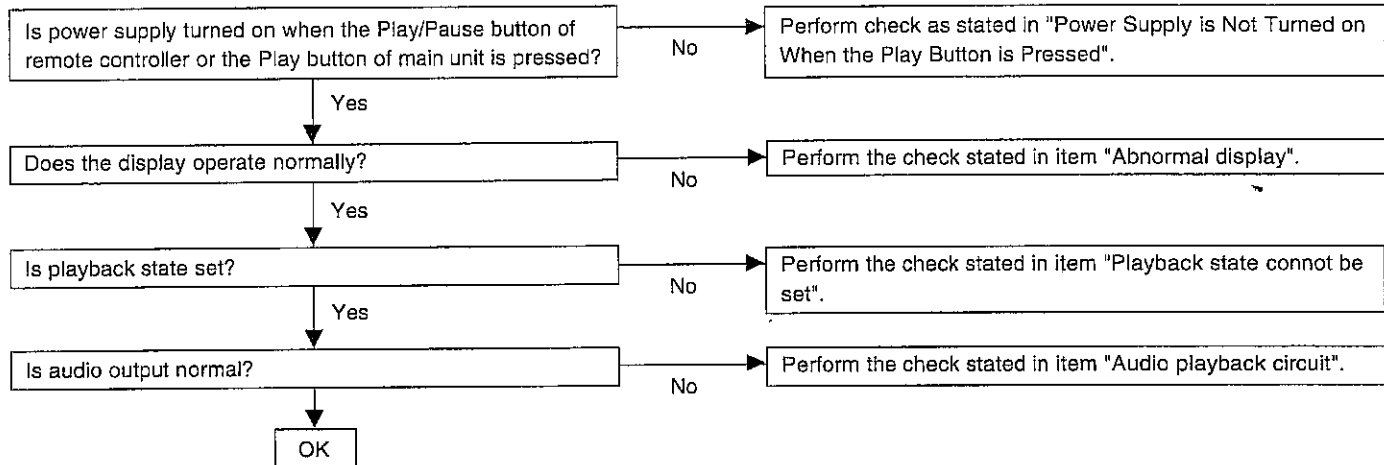
Remove the cabinet and follow the troubleshooting instructions.

"Track skipping and/or no TOC (Table Of Contents) may be caused by build up of dust or other foreign matter on the laser pickup lens. Before attempting any adjustment make certain that the lens is clean. If not, clean it as mentioned below."

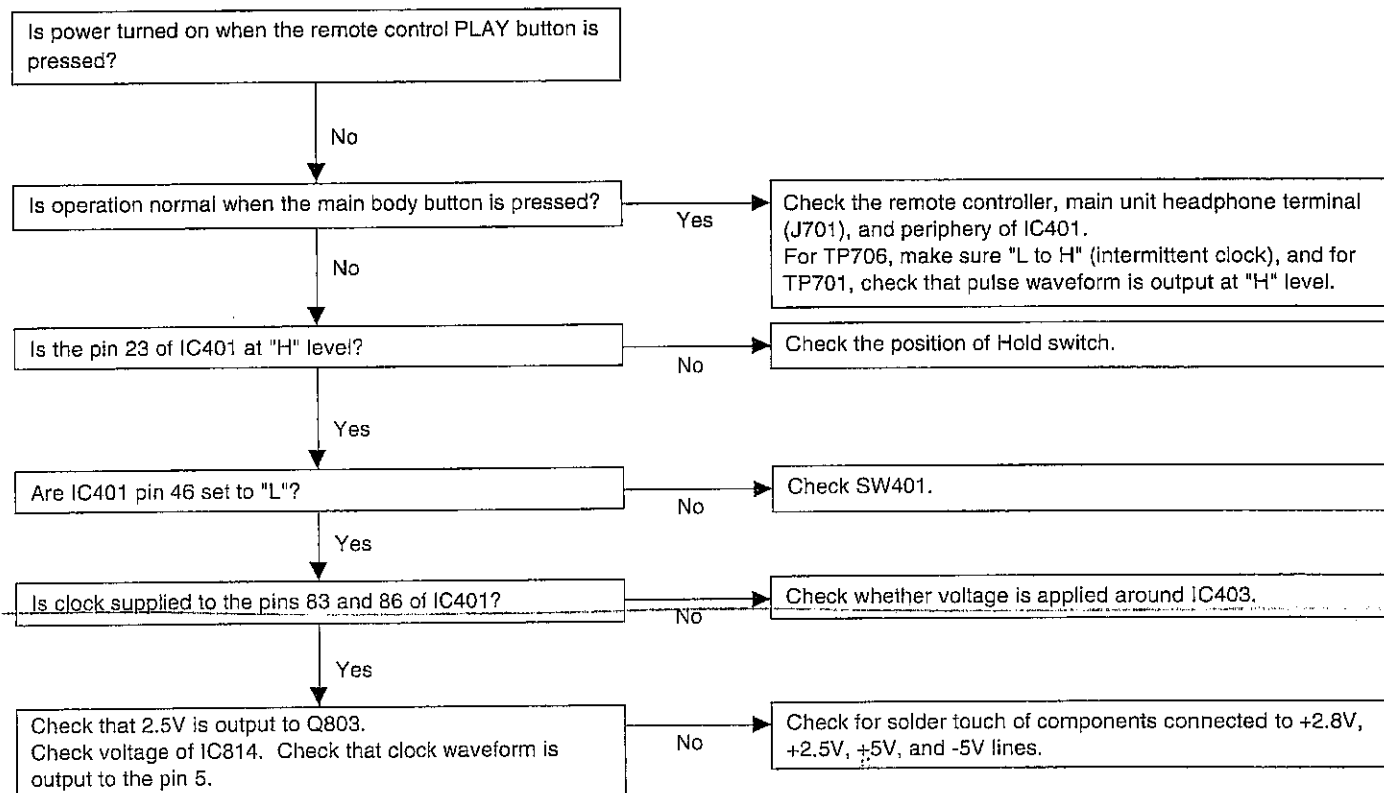
Turn the power off.

Gently clean the lens with a lens cleaning tissue and a small amount of isopropyl alcohol.

Do not touch the lens with the bare hand.



• Power is not turned on when the PLAY button is pressed



• Abnormal display

Are clock waveform and data waveform observed on the pin 1 and pin 6 of main unit headphone terminal (J701), respectively?

Yes

Replace the remote controller.

No

Is waveform observed on the pins 9 to 11, 93 and 94 of IC401?

No

Check for soldering failure around IC401.

Yes

Check between IC401 and J701.

• Playback state cannot be set

Is playback state unsetting for high reflection disc and low reflection disc?

Yes

Proceed to "Test mode check".

No

Is it impossible to playback the high reflection disc?

Yes

Is the pin 49 of IC401 at "L" level in high reflection disc insertion TEST mode?
Are the pin 42 of IC401 and the pin 23 of IC101 at "H" level?

No

Check SW902, mechanism PWB, CN601.

Yes

Proceed to "Test mode check".

Is it impossible to playback the low reflection disc?

Yes

Is the pin 49 of IC401 at "H" level in low reflection disc insertion state?
Are the pin 42 of IC401 and the pin 23 of IC101 at "L" level?

No

Check SW902, mechanism PWB, CN601.

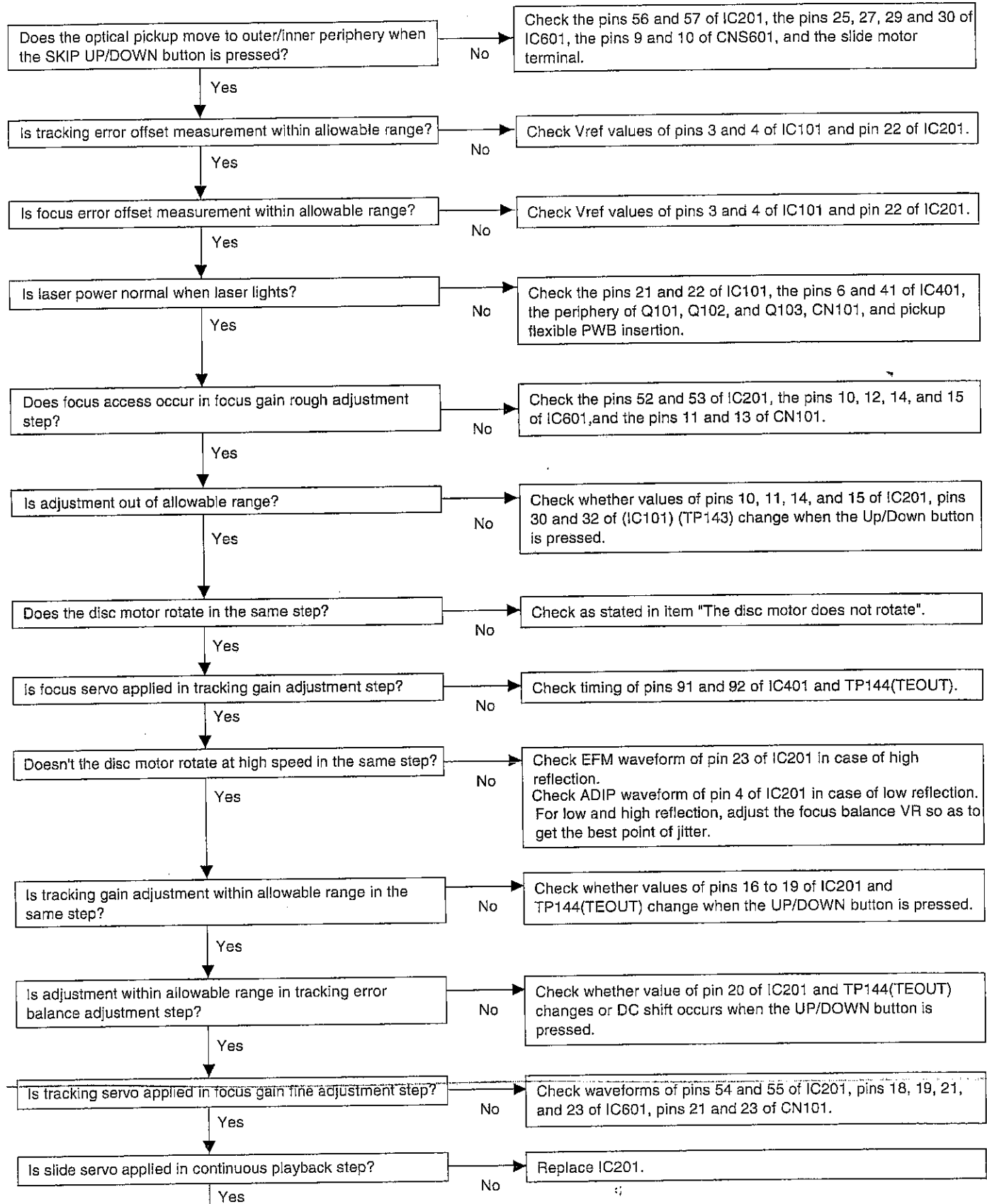
Yes

Proceed to "Test mode check".

MD-S50/MD-S50X

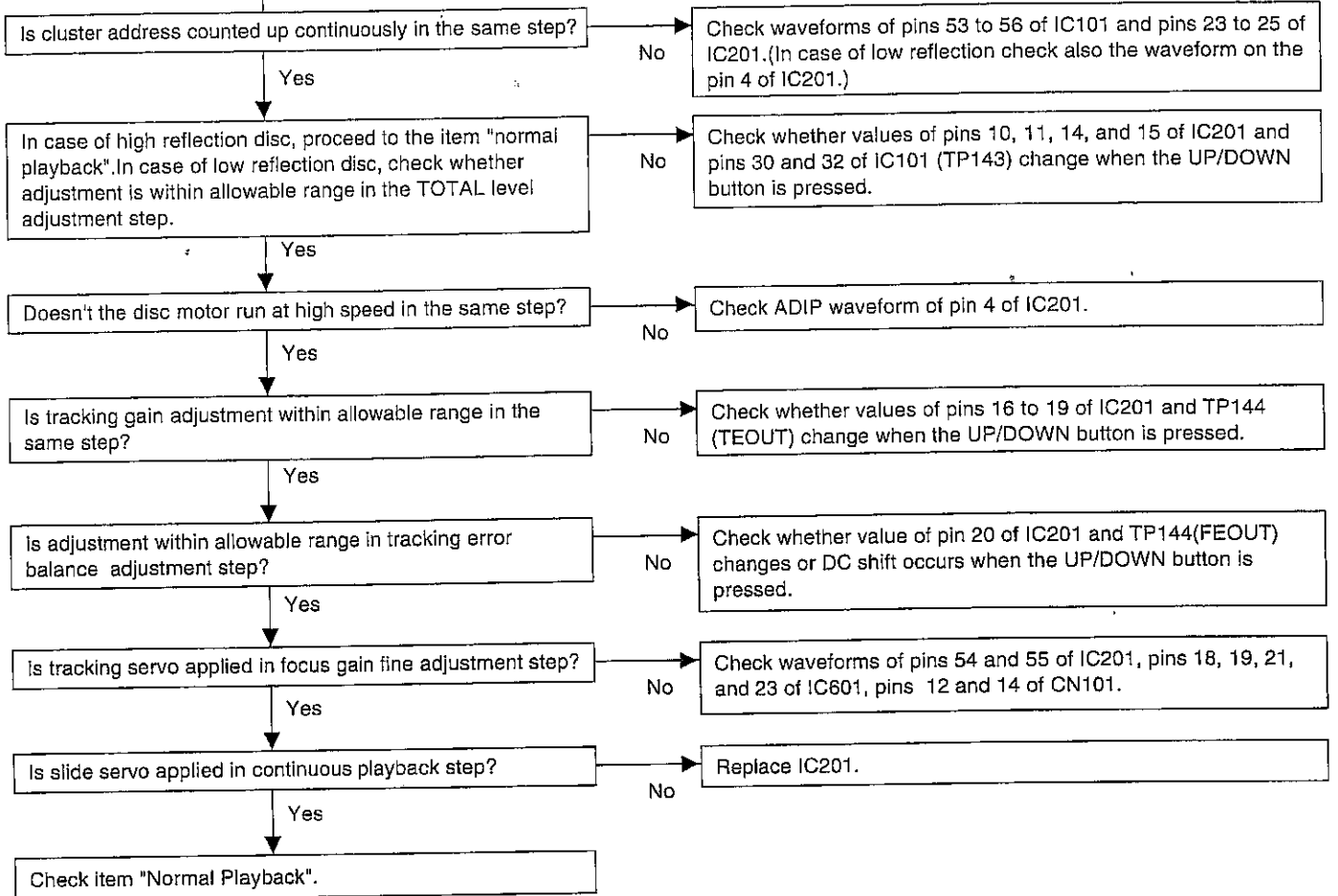
• Test mode check

Insert a high reflection (low reflection) disc, and once perform automatic adjustment in AUTO mode, and then check in MANUAL mode. Simultaneously observe waveforms of EFM(TP145), FEOUT(TP143), and TEOUT(TP144).



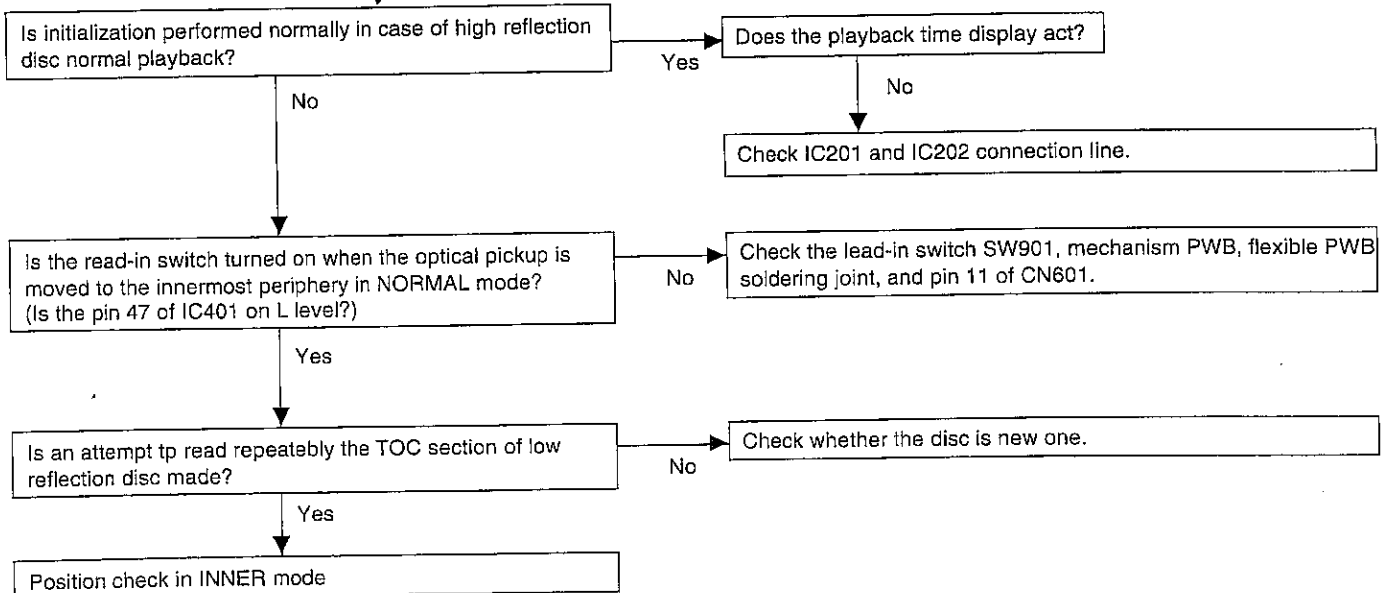
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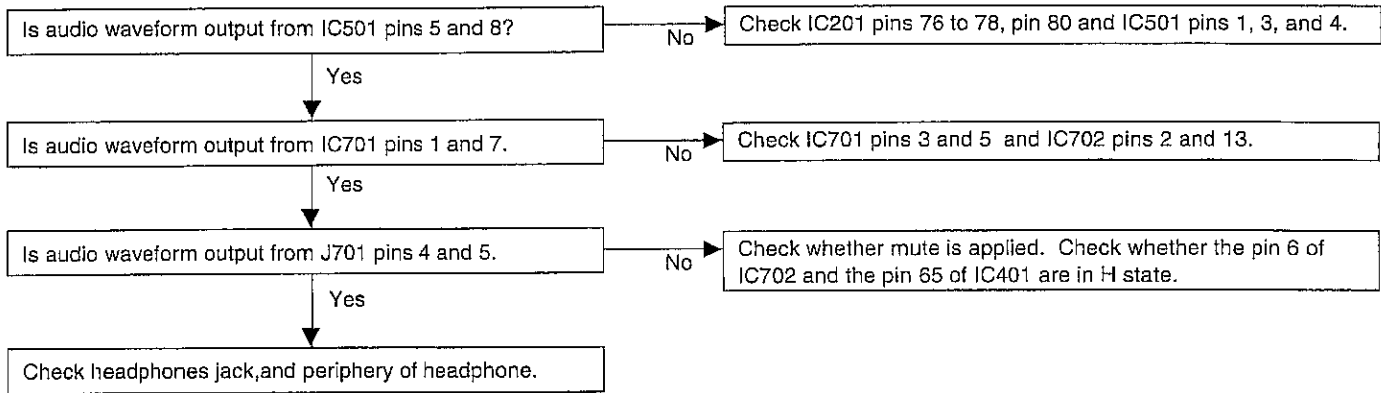
• Normal playback

When the address up to the sector address has been proved to be normal in the test mode.

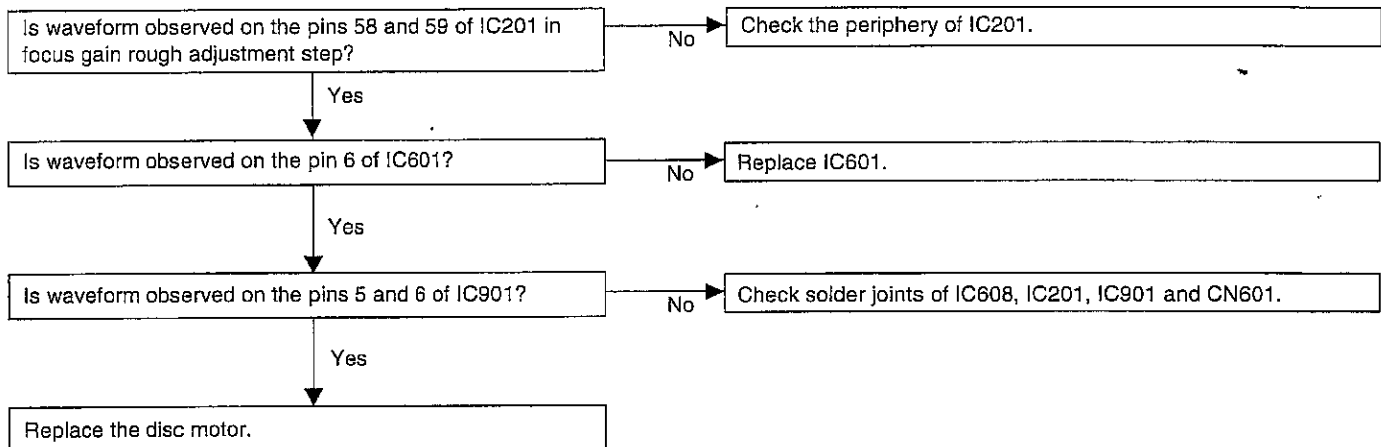


• Audio playback circuit

Although the playback time display is acting, no sound is given during playback in the normal mode.



• The disc motor fails to rotate



IC101 VH11R3R50//1 (IR3R50):RF signal processing (1/2)

Pin No.	Terminal Name	Input/Output	Function
1	RF1	Input	RF signal input terminal 1 RF signal output of optical pickup is input.
2	RF2	Input	RF signal input terminal 2 RF signal output of optical pickup is input.
3	VREF0	Output	Reference voltage ($V_{cc}/2$) output terminal Bypass capacitor (1 μ F or more) is connected.
4	VREFC	Input	Terminal to connect bypass capacitor for reference voltage input
5	RFADD	Output	Terminal for output of resistance addition of RF1 to 4
6	TCGI	Input	Inverting input terminal for track cross detection signal amplifier in Group mode
7	TCGO	Output	Output terminal for track cross detection signal amplifier
8	TBAL	Input	Terminal for adjustment of tracking balance
9	EOUT	Output	Terminal for output of I-V conversion of photodiode output E for servo
10	EIN	Input	Terminal for input of photodiode output E for servo
11	FIN	Input	Terminal for input of photodiode output F for servo
12	FOUT	Output	Terminal for output of I-V conversion of photodiode output F for servo
13	BOUT	Output	Terminal for output of I-V conversion of photodiode output B for servo
14	BIN	Input	Terminal for input of photodiode output B for servo
15	AIN	Input	Terminal for input of photodiode output A for servo
16	AOUT	Output	Terminal for output of I-V conversion of photodiode output A for servo
17	FBAL	Input	Terminal for adjustment of focus balance
18	LVV	Output	Terminal for output of power for monitor diode
19	APC	Input	Terminal to input monitor diode output
20	LDOUT	Output	Terminal for laser diode drive external PNP transistor
21	LDON	Input	Laser output ON/OFF control terminal H or open: Actuated L: Not actuated
22	LDVAR	Input	Laser output control terminal When power voltage is applied, laser output becomes maximum. When applied voltage is 0V, laser output becomes minimum.
23	DISC	Input	Disc mode selection signal input terminal H or open: Pit array L: Group
24	TCGAV	Output	DC conversion output of track cross amplifier (Group) output
25*	DFCTI	Input	Defect detection amplifier inverting input terminal
26*	DFTCTO	Output	Defect detection amplifier output terminal
27	GND1	—	Connection terminal
28	VCC1	—	Power terminal, 2.2 μ F capacitor is connected between this terminal and GND.
29	TONF	Input	TOTAL output amplifier feedback terminal
30	TOTAL	Output	TOTAL output terminal
31	FENF	Input	Focus error amplifier feedback terminal
32	FEOUT	Output	Focus error signal output terminal
33*	TENF	Input	Tracking error amplifier feedback terminal
34	TEOUT	Output	Tracking error signal output terminal
35	TCGF	Output	Track cross amplifier (Group) output
36	TCRSG	Input	Track cross comparator noninverting input terminal (Group mode)
37	TCRSG/	Input	Track cross comparator inverting input terminal (Group mode)
38	TCRSO	Output	Track cross output terminal
39	TCRSP	Input	Track cross comparator input terminal (Pit mode)
40	RFENV	Output	RF signal envelope output terminal
41	WBO	Output	ADIP signal output terminal

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

IC101 VH1R3R50/-1 (IR3R50):RF signal processing (2/2)

Pin No.	Terminal Name	Input/Output	Function
42*	LPFO	Output	ADIP signal LPF amplifier output terminal
43	LPFI	Input	ADIP signal LPF amplifier input terminal
44	HPFO	Output	ADIP signal HPF amplifier output terminal
45	ADO1	Output	ADIP signal preamplifier output terminal
46	ADI1	Input	ADIP signal input terminal
47	ADO2	Output	ADIP signal AGC amplifier output terminal
48	ADAGC	—	Terminal to connect smoothing capacitor for ADIP signal AGC
49	ADI2/	Input	ADIP AGC amplifier inverting input terminal
50	ADI2	Input	ADIP AGC amplifier noninverting input terminal
51	RFBP2	Output	RF2 input signal BPF output terminal
52	RFBP1	Output	RF1 input signal BPF output terminal
53	EFMI	Input	EFM input terminal (noninverting)
54	EFMI/	Input	EFM input terminal (inverting)
55	ASLO	Output	Slice control output terminal
56	EFM	Output	RF signal output terminal
57	EFMAI	Input	Equalizer amplifier input terminal
58	RFO1	Output	RF signal filter amplifier output signal
59	RFE0	—	Terminal to connect capacitor for RF signal equalizer
60*	RFO2	Output	RF signal preamplifier output
61	RFI2	Input	RF signal preamplifier input terminal
62	RFO3	Output	RF signal AGC amplifier output terminal
63	RFAGC	—	Terminal to connect smoothing capacitor for RF signal AGC
64	GNF2	—	Connection terminal
65	VCC2	—	Power terminal, 2.2 μ F capacitor is connected between this terminal and GND.
66	RFI3/	Input	RF signal AGC amplifier inverting input terminal
67	RFI3	Input	RF signal AGC amplifier noninverting input terminal
68	RFI2	Output	Terminal for output of resistance addition of RF1 input signal and RF2 input signal
69	RF1234	Output	Terminal for output of resistance addition of RF1 to 4 input signal
70	RF34	Output	Terminal for output of resistance addition of RF3 input signal and RF4 input signal
71	RF3	Input	RF3 signal input terminal 3 RF signal output of optical pickup is input.
72	RF4	Input	RF signal input terminal 4 RF signal output of optical pickup is input.

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

IC201 VHiLR37643/-1 (LR37643):Endec ATRAC (1/2)

Pin No.	Terminal Name	Input/Output	Function
1*	LKMADX	Output	Window signal in vicinity of link sector in playback mode
2	VDD1	—	Digital power supply
3	DGND	—	Digital GND
4	WBI	Input	ADIP wobble signal
5	TCRS	Input	Track cross signal
6	AUX	Input	General-use analog input
7	TE	Input	Tracking error signal E-F
8	FE	Input	Focus error signal A-B
9	TOTAL	Input	Focus signal A+B
10	AGAIN	Output	RFLSI A amplifier gain adjustment output
11	AGAINS	Output	RFLSI A amplifier gain selection output (high reflection → low reflection)
12	AVCC	—	Analog power supply
13	AGND	—	Analog GND
14	BGAINS	Output	RFLSI B amplifier gain selection output (high reflection → low reflection)
15	BGAIN	Output	RFLSI B amplifier gain adjustment output
16	FGAIN	Output	RFLSI F amplifier gain adjustment output
17	FGAINS	Output	RFLSI F amplifier gain selection output (high reflection → low reflection)
18	EGAINS	Output	RFLSI E amplifier gain selection output (high reflection → low reflection)
19	EGAIN	Output	RFLSI E amplifier gain adjustment output
20	TBAL	Output	Balance adjustment for tracking error
21	TCGAIN	Output	Gain adjustment output of track cross detection amplifier
22	VREF	Input	RFLSI reference voltage
23	EFMI	Input	EFM signal input from RF amplifier
24	ASYX	Output	Negative logic output for EFM signal slice level control
25	ASY	Output	Positive logic output for EFM signal slice level control
26-28	RAA3-1	Output	Address output to external D-RAM, ADR3-1
29	RAA0	Output	Address output to external D-RAM, ADR0 (LSB)
30-34	RAA4-8	Output	Address output to external D-RAM, ADR4-8
35	RAOEX	Output	Data output enable signal output to external D-RAM
36	RACASX	Output	Column address strobe signal output to external D-RAM
37	VDD2	—	DRAM interface power supply
38	DGND	—	Digital GND
39	RAD2	In/Output	Data input/output to and from external D-RAM, D2
40	RAD3	In/Output	Data input/output to and from external D-RAM, D3(MSB)
41	RAA9	Output	Address output to external D-RAM, ADR9
42	RARASX	Output	Low address strobe signal output to external D-RAM
43	RAWEX	Output	Data write enable signal output to external D-RAM
44	RAD1	In/Output	Data input/output to and from external D-RAM, D1
45	RAD0	In/Output	Data input/output to and from external D-RAM, D0(LSB)
46*	ACRCER	Output	CRC error flag monitor output of ADIP
47*	PLCK	Output	EFM PLL clock output in playback mode
48,49	TEST0,1	Input	Input for test, usually connected to GND
50	TEST2	Input	Input for test, endecoder/servo mode and ATRAC mode selection Usually connected to GND
51*	X176KO	Output	Clock output, $f = 176.4 \text{ kHz}(4fs)$
52	FODRF	Output	Focus servo forward output PWM
53	FODRR	Output	Focus servo reverse output PWM
54	TRDRF	Output	Tracking servo forward output PWM
55	TRDRR	Output	Tracking servo reverse output PWM
56	SLDRF	Output	Slide servo forward output PWM
57	SLDRR	Output	Slide servo reverse output PWM
58	SPDRF	Output	Slide servo forward output or spindle servo output PWM
59	SPDRR	Output	Slide servo reverse output or spindle forward/reverse rotation selection

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

IC201 VHiLR37643/-1 (LR37643):Endec ATRAC (2/2)

Pin No.	Terminal Name	Input/Output	Function
60	EFMO	Output	EFM signal output in record mode, CIF (CI error flag) monitor output in playback
61	X700KO	Output	Clock output, $f = 705.6$ kHz, clock is output also when RSTX = 0.
62	VDD1	—	Digital Power
63	DGND	—	Digital GND
64	X1I	Input	Oscillation circuit input, 33.8688M(768 Fs)
65	X1O	Output	Oscillation circuit output, 33.8688M(768 Fs)
66*	DIN	Input	Digital input signal
67*	DOUT	Output	Digital output signal
68*-75*	EXPORT0-7	Output	Microcomputer expansion output port
76	LRCK	Output	Music data Lch/Rch selection output
77*	BCLK	Output	Music data shift clock
78	DFCK	Output	Clock for AD/DA converter digital filter, 256 Fs
79*	ADDATA	Input	Music data input
80	DADATA	Output	Music data output
81	FOK	Output	Focus OK detection signal
82	SENSE	Output	Servo status detection signal
83	COUT	Output	Track cross signal output
84	MCCK	Output	Clock output for microcomputer Clock is output also when RSTX = 0.
85	DINTX	Output	Terminal to output interruption request to system control interface
86	RSTX	Input	Chip reset input, resetting in L state (note)
87	VDD1	—	Digital power
88	DGND	—	Digital GND
89	RFLCT	Input	Signal to change gain of A, B, E, and F depending on reflection factor of disc
90	SYD0	In/Output	Data bus terminal of system control interface (LSB)
91-96	SYD1-6	In/Output	Data bus terminal of system control interface
97	SYD7	In/Output	Data bus terminal of system control interface (MSB)
98	SYWRX	Input	Register write pulse input of system control interface
99	SYRDX	Input	Register read pulse input of system control interface
100	SYRS	Input	Register selection input of system control interface

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

IC201 VHiLR37643/-1 (LR37643):Endec ATRAC

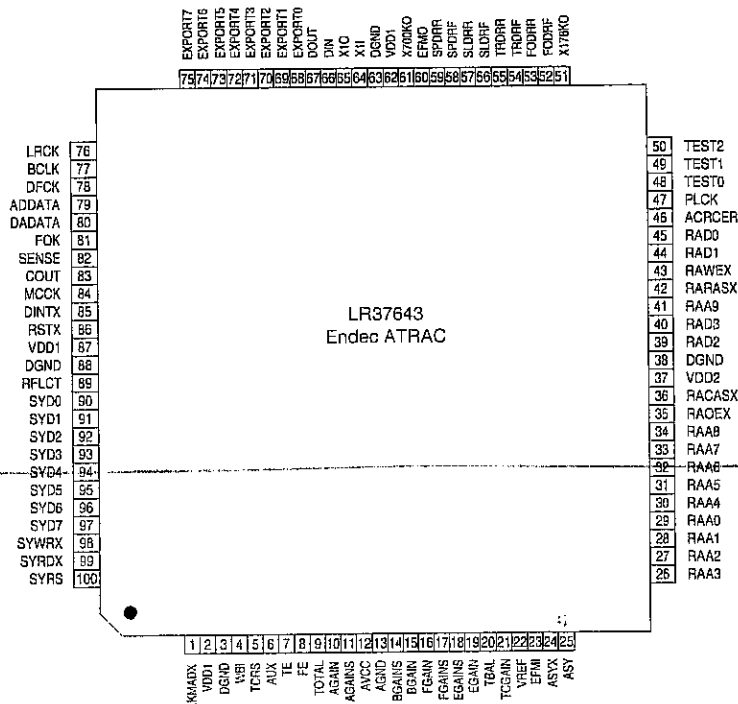


Figure 48 BLOCK DIAGRAM OF IC

IC401 RH-IX2528AF04(IX2528AF):System Microcomputer (1/2)

Pin No.	Port Name	Terminal Name	Input/Output	Function
1	AN14	KEY1	Input	Main unit input detection (input detection input 1 for checker)
2	AN15	KEY2	Input	Checker input detection input 2
3	AN16	TEMP	Input	Temperature detection input
4	AN17	TCG	Input	TOTAL signal level detection input
5	AVSS	AVSS	Input	A/D converter ground potential
6	AN00	LDVAR	Output	Laser power set output
7*	AN01	MCMON	Output	Internal operation monitor output
8	AVREF1	AVREF1	Input	D/A converter reference voltage input
9	P70	KDATA	Input	Remote control microcomputer key data input
10	P71	RDATA	Output	Remote control microcomputer display data output
11	P72	RSCK	Output	Remote control microcomputer serial clock output
12	VSS	VSS	Input	Ground potential
13*	P20	DSPSTB	Output	Strobe signal output for checker
14*	SO1	DSPDAT	Output	Serial data output for checker
15*	SCK1	DSPSCK	Output	Serial clock output for checker
16*,17*	P23,24	P23,24	—	Not used
18	P25	EPCS	Output	E ² PROM chip selection output
19	P26	EEPD	In/Output	E ² PROM serial data input/output
20	P27	EEPK	Output	E ² PROM serial clock output
21	P80/A0	ATT1	In/Output	Analog VOL control output 1
22	P80/A1	ATT2	In/Output	Analog VOL control output 2
23	P82	HOLD	Input	Main unit key HOLD detection input
24*	P83	P83	—	Not used
25	P84	PLAY	Input	Main unit PLAY key input
26	P85	P85	—	Not used
27	P86	XRST	Output	LSI reset signal output
28	P87	RP	Output	Record/Playback selection output
29-36	P40-47	SYSD0-7	In/Output	LSI parallel data bus
37	P50	SYWRX	Output	LSI register write pulse signal output
38	P51	SYRDX	Output	LSI register read pulse signal output
39	P52	SYCS	Output	LSI register selection signal output
40	P53	PLED	Output	Power indicator LED control output
41	P54	LDON	Output	Laser ON/OFF control output
42	P55	DISC	Output	Tracking signal polarity selection output
43	VSS	VSS	Input	Ground potential
44*	P56	P56	—	Not used
45	P57	OPEN	Input	Lid opening detection input
46*	P60	P60	—	Not used
47	P61	INNSW	Input	Innermost periphery detection input
48*	P62	P62	—	Not used
49	P63	DISCID	Input	Disc ID detection input
50*	P64	P64	—	Not used
51*	P65	P65	—	Not used
52*	P66	P66	—	Not used
53	P67	DCNT	Output	Mechanism driver circuit ON/OFF control output
54	P100	PCNT1	Output	Power control output 1 (2.8V)
55	P101	PCNT2	Output	Power control output 2 (2.5V/5.0V)
56	P102	PCNT3	Output	Power control output 3 ((RF power supply))
57	P103	PCNT4	Output	Power control output 4 (laser power supply)
58*-62*	P30-34	P30-34	—	Not used
63	P35	EMPH	Output	Emphasis control output
64	P36	BEEP	Output	Beep output
65	P37	PBMUTE	Output	Playback side audio IC power supply control output

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

MD-S50/MD-S50X

IC401 RH-iX2528AF04(IX2528AF):System Microcomputer (2/2)

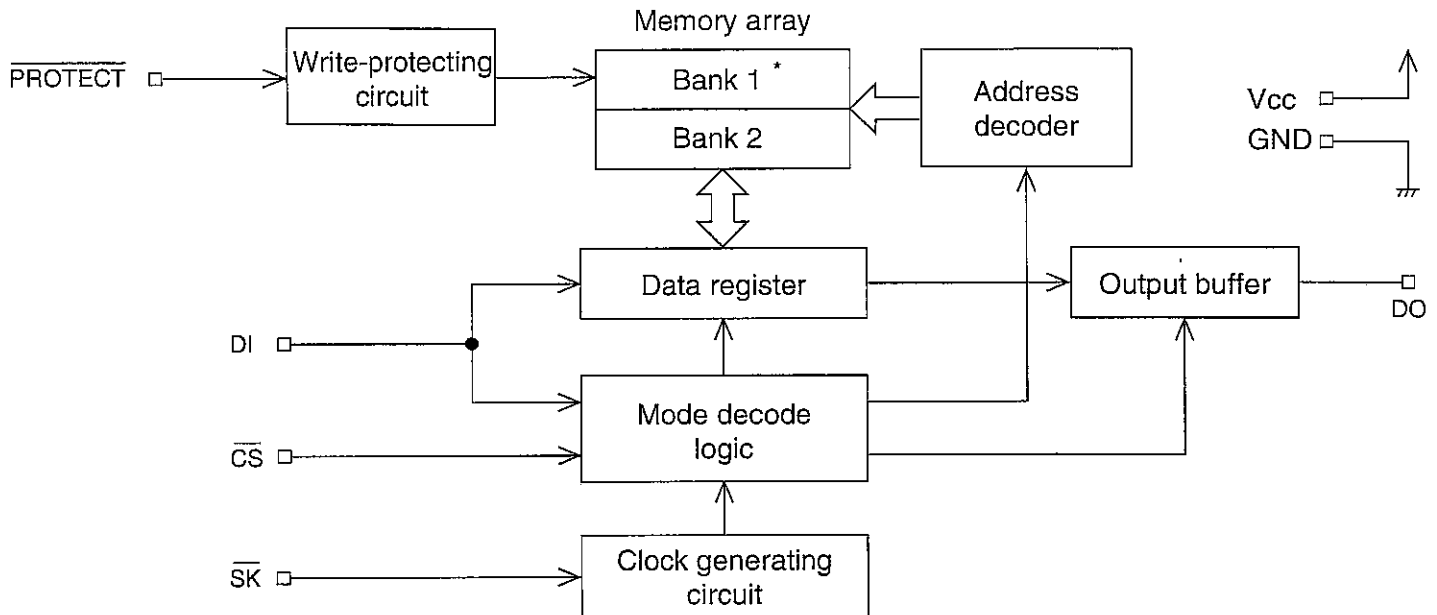
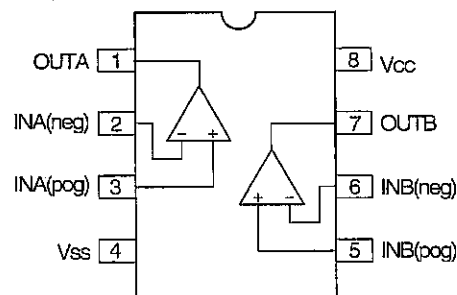
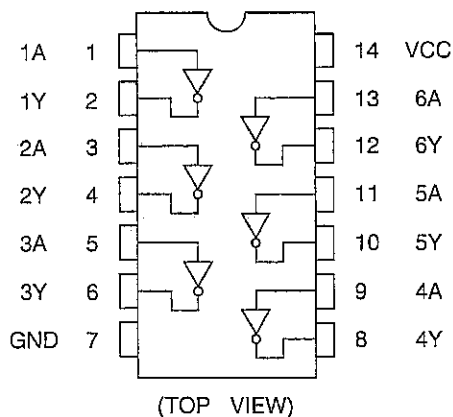
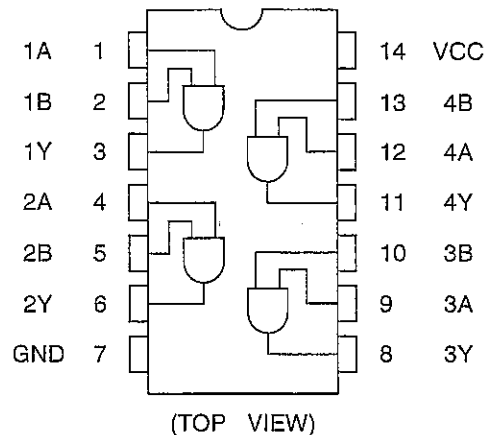
Pin No.	Port Name	Terminal Name	Input/Output	Function
66,67	P90,91	TEST0,1	Input	TEST mode setting input 0, 1
68*	P92	P92	—	Not used
69*	P93	P93	—	Not used
70*	P94	P94	—	Not used
71	P95	MODE	Input	Destination ID signal input
72	P96	P96	—	Not used
73*-78*	P120-125	P120-P125	—	Not used
79	P126	PCHG	Output	Battery (internal/external) selection signal output
80	P127	CGCNT	Output	Charge control output
81	IC	IC	Input	Internally connected
82*	X2	X2	—	Not used
83	X1	X1	Input	Main system clock input
84	VDD	VDD	Input	Positive power
85*	XT2	XT2	—	Not used
86	XT1	XT1	Input	Sub-system clock input
87	RESET	RESET	Input	System reset input
88	T100	CIN	Input	Track cross count input
89	T101	SPIN	Input	Spin motor rotational speed detection input
90	INTP2	DINT	Input	LSI interruption request signal input
91	P03/INTP3	SENSE	Input	Servo status detection signal input
92	P04	FOK	Input	Focus OK signal input
93	P05	RPGIN	Input	Remote controller plug insertion detection interruption input
94	INTP6	MODE	Input	Remote controller PLAY key input
95	AVDD	AVDD	Input	A/D converter analog power supply
96	AVREF0	AVREF0	Input	A/D converter reference voltage input
97	AN10	BATINN	Input	Internal battery voltage detection input
98	AN11	BATEXT	Input	External battery voltage detection input
99	AN12	AN12	—	Not used
100	AN13	KEY	—	Not used

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

IC402 VHiS29194A/-1 (S29194A):EE PROM

Pin No.	Terminal Name	Input/Output	Function
1*	NC	—	Not connected
2	VCC	—	Power supply
3	$\overline{\text{CS}}$	Input	Chip selection input
4	$\overline{\text{SK}}$	Input	Serial clock input
5	DI	Input	Serial data input
6	DO	Output	Serial data output
7	GND	—	GND
8*	PROTECT	Input	Memory protection output Connected to GND or open: Protection valid Connected to VCC: Protection invalid

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

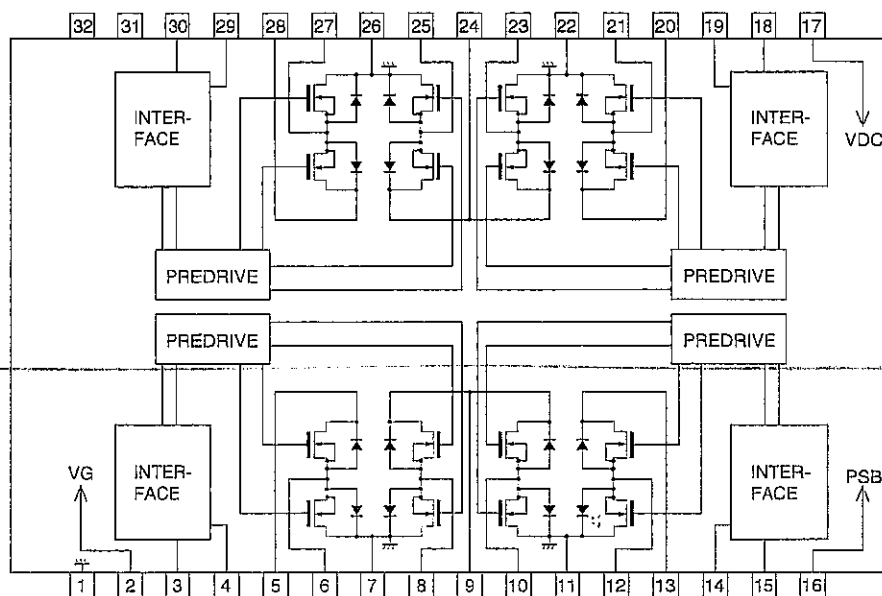
**IC701 VHiTDA1308T-1 (TDA1308T):Headphone driver****IC807,813 VHiACT04FS/-1 (ACT04FS)
:Power circuit****IC808 VHiVHC08FS/-1 (VHC08FS)
:Power circuit**

MD-S50/MD-S50X

IC601 VHiBH6510FS-1 (BH6510FS):Motor Driver

Pin No.	Terminal Name	Input/Output	Function
1	GND	—	Preamplifier ground terminal
2	VG	—	Gate voltage supply terminal
3	IN4R	Input	CH4 reverse input
4	IN4F	Input	CH4 forward input
5	VM4	—	Power section power terminal
6	OUT4F	Output	CH4 forward output
7	PGND4	—	Power section ground terminal
8*	OUT4R	Output	CH4 reverse output
9	VM34	—	Power section power terminal
10	OUT3R	Output	CH3 reverse output
11	PGND3	—	Power section ground terminal
12	OUT3F	Output	CH3 forward output
13	VM3	—	Power section power terminal
14	IN3F	Input	CH3 forward input
15	IN3R	Input	CH3 reverse input
16	STOPB	—	Power OFF terminal
17	VDD	—	Preamplifier power terminal
18	IN1R	Input	CH1 reverse input
19	IN1F	Input	CH1 forward input
20	VM1	—	Power section power terminal
21	OUT1F	Output	CH1 forward output
22	PGND1	—	Power section ground terminal
23	OUT1R	Output	CH1 reverse output
24	VM12	—	Power section power terminal
25	OUT2R	Output	CH2 reverse output
26	PGND2	—	Power section ground terminal
27	OUT2F	Output	CH2 forward output
28	VM2	—	Power section power terminal
29	IN2F	Input	CH2 forward input
30	IN2R	Input	CH2 reverse input
31*	NC	—	Not connected internally
32*	NC	—	Not connected internally

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.



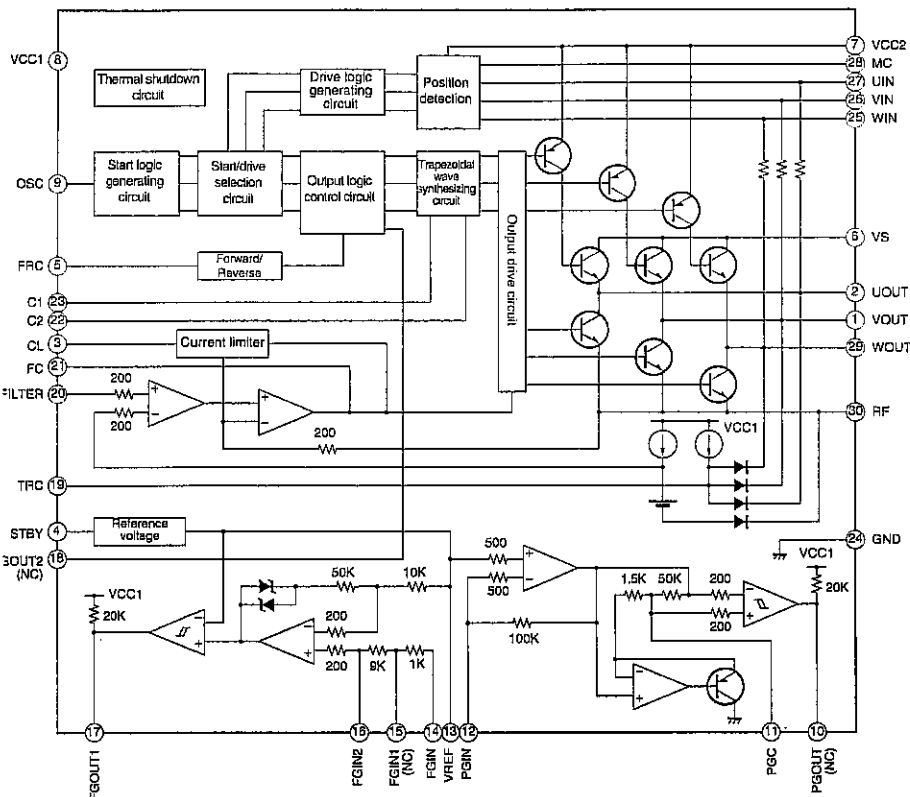
IC901 VHiLB1888V/-1 (LB1888V):3-phase brushless sensorless motor driver

Pin No.	Terminal Name	Input/Output	Function
1	VOUT	Output	V-phase output terminal
2	UOUT	Output	U-phase output terminal
3	CL	Input	Terminal to set operating voltage of current limiter
4	STBY	Input	When this terminal is set to 0.7V or less or opened, all the circuits are disabled (standby state).
5	FRC	Input	Terminal to select forward or reverse rotation of motor L level: Forward rotation (-0.2 to 0.7V), H level: Reverse rotation (2.2V to VCC1)
6	VS	—	Power supply terminal to apply motor voltage to set output amplitude.
7	VCC2	—	Power supply voltage to apply voltage of source side pre-drive PNP transistor and FG amplifier
8	VCC1	—	Power supply terminal to apply whole voltage excepting motor voltage, source side pre-drive voltage and FG amplifier voltage
9	OSC	Input	Terminal to connect triangular wave oscillation capacitor to generate forced motor start waveform when starting
10*	PGOUT	Output	PG amplifier output terminal
11	PGC	Input	Terminal to connect capacitor for PG amplifier peak hold
12	PGIN	Input	PG amplifier input terminal
13	VREF	Output	Internal 1.5V reference voltage. Reference voltage for FG and PG amplifier
14	FGIN	Input	PG amplifier input terminal
15*	FGIN1	Input	Terminal to connect capacitor for FG amplifier input signal noise filter
16	FGIN2	Input	Terminal to connect capacitor for FG amplifier input signal noise filter
17	FGOUT1	Output	FG amplifier output terminal
18*	FGOUT2	Output	Output of FG square waveform (to be synthesized from coil output waveform)
19	TRC	Input	Terminal to detect lower side envelop waveform of coil output waveform
20	FILTER	Input	Voltage is controlled to control motor voltage.
21	FC	Input	Frequency characteristic correcting terminal
22,23	C2,C1	Output	Terminal to connect capacitor for triangular wave oscillation
24	GND	—	GND terminal
25	WIN	Input	Input terminal of coil waveform detection comparator
26	VIN	Input	Input terminal of coil waveform detection comparator
27	UIN	Input	Input terminal of coil waveform detection comparator
28	MC	Input	Motor coil neutral point input terminal
29	WOUT	Output	W-phase output terminal Logic "H" is WIN>WIN2 state.
30	RF	—	GND of output transistor This terminal voltage is detected for constant current drive, and the current limiter is actuated.

In this unit, the terminal with asterisk mark (*) is (open) terminal which is not connected to the outside.

MD-S50/MD-S50X

IC901 VHiLB1888V/-1 (LB1888V):3-phase brushless sensorless motor driver



VOUT	1	30	RF
UOUT	2	29	WOUT
CL	3	28	MC
STBY	4	27	UIN
FRC	5	26	VIN
VS	6	25	WIN
VCC2	7	24	GND
VCC1	8	23	C1
OSC	9	22	C2
(NC) PGOUT	10	21	FC
PGC	11	20	FILTER
PGIN	12	19	TRC
VREF	13	18	FGOUT2 (NC)
FGIN	14	17	FGOUT1
(NC) FGIN1	15	16	FGIN2

SHARP PARTS GUIDE

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Explanation of capacitors/resistors parts codes

Capacitors

VCC Ceramic type
 VCK Ceramic type
 VCT Semiconductor type
 VC •• MF Cylindrical type (without lead wire)
 VC •• MN Cylindrical type (without lead wire)
 VC •• TV Square type (without lead wire)
 VC •• TQ Square type (without lead wire)
 VC •• CY Square type (without lead wire)
 VC •• CZ Square type (without lead wire)
 VC J .. The 13th character represents capacity difference.
 ("J" $\pm 5\%$, "K" $\pm 10\%$, "M" $\pm 20\%$, "N" $\pm 30\%$,
 "C" ± 0.25 pF, "D" ± 0.5 pF, "Z" $+80-20\%$.)

If there are no indications for the electrolytic capacitors, error is $\pm 20\%$.

Resistors

VRD Carbon-film type
 VRS Carbon-film type
 VRN Metal-film type
 VR •• MF Cylindrical type (without lead wire)
 VR •• MN Cylindrical type (without lead wire)
 VR •• TV Square type (without lead wire)
 VR •• TQ Square type (without lead wire)
 VR •• CY Square type (without lead wire)
 VR •• CZ Square type (without lead wire)
 VR J .. The 13th character represents error.
 ("J" $\pm 5\%$, "F" $\pm 1\%$, "D" $\pm 0.5\%$.)

If there are no indications for other parts, the resistors are $\pm 5\%$ carbon-film type.

NOTE:

Parts marked with "△" are important for maintaining the safety of the set.

Be sure to replace parts with specified ones for maintaining the safety and performance of the set.

NO.	PART CODE	★ PRICE RANK	DESCRIPTION
INTEGRATED CIRCUITS			
IC101	VHII3R50/-1	J AV	RF Signal Processor,IR3R50
IC201	VHILR37643/-1	J BM	Endec ATRAC,LR37643
IC202	RH-IX2529AFZZ	J BG	4Mbit D-RAM,IX2529AF
IC401	RH-IX2528AF04	J AX	System Microcomputer, IX2528AF
IC402	VHIS29194A/-1	J AG	E ² PROM,S29194A
IC403	VHITC7W14FU-1	J AF	Inverter,TC7W14FU
IC501	VHICS4333/-1	J AQ	D/A Converter,CS4333
IC601	VHIBH6510FS-1	J AR	Motor Drive,BH6510FS
IC701	VHITDA1308T-1	J AG	Headphone Driver,TDA1308T
IC702	VHIBU4052FV-1	J AF	4CH Analoge Switch,BU4052FV
IC801	VHIFW201/-1	J AL	Power Drive FW201
IC802	VHITC7W04FU-1	J AE	Inverter,TC7W04FU
IC803	VHI61AC2102-1	J AE	Reset,61AC2102
IC804	VHIRN4986/-1	J AD	Charge Drive,RN4986
IC805	VHI62AP2802-1	J AF	Microcomputer Power Source 62AP2002
IC806	VHIIRF7504/-1	J AK	Power Drive,IRF7504
IC807	VHIACT04FS/-1	J AF	Power Drive,ACT04FS
IC808	VHIVHC08FS/-1	J AF	Power Drive,VHC08FS
IC809	VHITC7W02FU-1	J AE	Power Drive,TC7W02FU
IC810	VHINJM2115V-1	J AE	Ope Amp.,NJM2115V
IC812	VHI62AP2802-1	J AF	Voltage Regulator,62AP2802
IC813	VHIACT04FS/-1	J AF	Power Drive,ACT04FS
IC814	VHITC7W14FU-1	J AF	Inverter,TC7W14FU
IC815	VHIHN1C03FU-1	J AD	Constant Current Drive, HN1C03FU
IC816	VHIRN4986/-1	J AD	Charge Drive,RN4986
IC821	VHI62AP2802-1	J AF	Voltage Regulator,62AP2802
IC901	VHILB1888V/-1	J AS	3-Phase Hleess Motor Driver, LB1888V

TRANSISTORS

Q101	VS2SA17457/-1	J AB	Silicon,PNP,2SA17457
Q102	VSDTA114TE/-1	J AB	Digital,PNP,DTA114 TE
Q103	VSDTC144TE/-1	J AC	Digital,NPN,DTC144 TE
Q481	VSDTA124EE/-1	J AB	Digital,PNP,DTA124 EE
Q482	VSDTC114EE/-1	J AC	Digital,NPN,DTC144 TE
Q701,702	VS2SK2036/-1	J AD	FET,2SK2036
Q801	VS2SD1950/-1	J AD	Silicon,NPN,2SD1950
Q802	VSDTC144EE/-1	J AB	Digital,NPN,DTC144 EE
Q803	VSDTA123JE/-1	J AC	Digital,PNP,DTA123JE
Q804	VS2SK2316/-1	J AG	FET,2SK2316
Q805	VS2SA1745/-1	J AC	Silicon,PNP,2SA1745
Q806	VS2SD1950/-1	J AD	Silicon,NPN,2SD1950
Q809	VSDTC144EE/-1	J AB	Digital,NPN,DTC144 EE
Q810,811	VSDTA114TE/-1	J AB	Digital,PNP,DTA114 TE

DIODES

D401	VHDDA221/-1	J AB	Silicon,DA221
D402	VHD1SS368/-1	J AC	Silicon,1SS368
D451,452	VHE015Z5R1Y-1	J AD	Zener,015Z5R1Y-1
D801	VHDSB10015C-1	J AD	Silicon,SB10015C
D803,804	VHDSB10015C-1	J AD	Silicon,SB10015C
D805	VHD1SS373/-1	J AD	Silicon,1SS373
D806,807	VHD1SS372/-1	J AD	Silicon,1SS372
D808	VHE015Z5R6Z-1	J AD	Zener,015Z5R6Z-1
LED401	VHPCL200HRC-1	J AD	LED,Red,CL200HRC

COILS

L100	VPANMR47K0000	J AD	0.47 μH
L201,202	VPANMR47K0000	J AD	0.47 μH
L501	VPANMR47J0000	J AC	4.7 μH
L600	RCILR0559AFZZ	J AC	47 μH
L601,602	RCILC0246AFZZ	J AC	100 μH
L603,604	RCILR0559AFZZ	J AC	47 μH
L606	RCILC0246AFZZ	J AC	100 μH
L607,608	RCILC0246AFZZ	J AC	100 μH
L612	VPANMR47K0000	J AD	0.47 μH
L801	RCILC0330AFZZ	J AC	1 μH
L802	RCILC0332AFZZ	J AC	4.7 μH
L803	RCILC0331AFZZ	J AC	2.2 μH
L804,805	VPANMR47K0000	J AD	0.47 μH
L806	RCILC0246AFZZ	J AC	100 μH
L809	RCILC0332AFZZ	J AC	4.7 μH

VARIABLE RESISTORS

VR101	—	—	Semi-VR,68 kohms (B) [Focus Error Balance] (Ref to No.24 Disc motor Ass'y)
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VIBRATOR

XL201	RCRSC0003AFZZ	J AK	Crystal,33.868 MHz
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CAPACITORS

C100	VCKYTQ1CB105K	J AD	1 μF,16V
C101	VCKYTQ1CF225Z	J AB	2.2 μF,16V
C102,103	VCKYTQ1CB474K	J AC	0.47 μF,16V
C104	VCCCCY1HH3R0C	J AA	3 pF (CH),50V
C105	VCKYCY1HB222K	J AA	0.0022 μF,50V
C106,107	VCCCCY1HH120J	J AA	12 pF (CH),50V
C108,109	VCCCCY1HH8R0D	J AA	8 pF (CH),50V
C110	VCCCCY1HH330J	J AA	33 pF (CH),50V
C111,112	VCKYTQ1CB105K	J AD	1 μF,16V
C114	VCSAFA0JJ106M	J AD	10 μF,6.3V,Electrolytic,Tantalum
C115	VCCCCY1HH221J	J AA	220 pF (CH),50V
C116	VCCCCY1HH101J	J AA	100 pF (CH),50V
C118	VCKYCY1HB331K	J AA	330 pF,50V
C119	VCKYCY1HB332K	J AA	0.0033 μF,50V
C120	VCKYCY1HB331K	J AA	330 pF,50V
C121,122	VCKYTQ1CB105K	J AD	1 μF,16V
C123,124	VCKYCY1EB223K	J AB	0.022 μF,25V
C125,126	VCKYCY1HB682K	J AA	0.0068 μF,50V
C127	VCKYTV1CB104K	J AA	0.1 μF,16V
C128	VCKYTQ1CB105K	J AD	1 μF,16V
C129	VCSAFA0JJ106M	J AD	10 μF,6.3V,Electrolytic,Tantalum
C130,131	VCKYTV0JB105K	J AD	1 μF,6.3V
C132	VCCCCY1HH6R0C	J AA	6 pF (CH),50V
C133	VCCCCY1HH100D	J AA	10 pF (CH),50V
C150	VCCCCY1HH2R0C	J AA	2 pF (CH),50V
C160	VCCSCY1HL391J	J AA	390 pF,50V
C161	VCKYTQ1CB105K	J AD	1 μF,16V
C164	VCKYCY1CB473K	J AA	0.047 μF,16V
C165	VCKYCY1CB333K	J AA	0.033 μF,16V
C201	VCKYTV1CF105Z	J AB	1 μF,16V
C202	VCSAFA0JJ106M	J AD	10 μF,6.3V,Electrolytic,Tantalum
C203,204	VCKYCY1EF104Z	J AA	0.1 μF,25V
C205	VCCCCY1HH330J	J AA	33 pF (CH),50V
C211,212	VCCCCY1HH5R0C	J AA	5 pF (CH),50V
C260	VCCCCY1HH680J	J AA	6.8 pF,50V
C401	VCKYCY1CB473K	J AA	0.047 μF,16V
C404	VCKYTV1CF105Z	J AB	1 μF,16V
C405	VCCCCY1HH100D	J AA	10 pF (CH),50V
C406	VCKYCY1HB681K	J AA	680 pF,50V
C407	VCKYTV1CF105Z	J AB	1 μF,16V
C408	VCKYCY1EB103K	J AA	0.01 μF,25V
C501	VCSAFA0JJ106M	J AD	10 μF,6.3V,Electrolytic,Tantalum
C503,504	VCKYTQ1CF225Z	J AB	2.2 μF,16V
C505,506	VCKYCY1HB222K	J AA	0.0022 μF,50V
C600	RC-KZ1170AFZZ	J AF	3.3 μF,6.3V
C601~605	VCKYTV1CF105Z	J AB	1 μF,16V
C607,608	VCKYTV1CF105Z	J AB	1 μF,16V
C611	VCKYTQ1CF225Z	J AB	2.2 μF,16V
C612	VCKYTV1CB104K	J AA	0.1 μF,16V
C701,702	VCSAFA0JJ106M	J AD	10 μF,6.3V,Electrolytic,Tantalum
C703,704	VCKYCY1CB473K	J AA	0.047 μF,16V
C705,706	VCKYCY1EB103K	J AA	0.01 μF,25V
C707	VCKYTV1HB473K	J AA	0.047 μF,50V
C715,716	VCCCCY1HH560J	J AA	56 pF (CH),50V
C760	VCKYCY1EF104Z	J AA	0.1 μF,25V
C770	VCKYTV1HB102K	J AA	0.001 μF,50V
C800	VCKYTV1CF105Z	J AB	1 μF,16V
C801	VCKYTV1EB103K	J AA	0.01 μF,25V
C803	RC-EZ1626AFZZ	J AD	220 μF,4V,Electrolytic
C804,805	VCKYTV1CF105Z	J AB	1 μF,16V
C807	VCKYTQ1CB105K	J AD	1 μF,16V
C808	RC-EZ1625AFZZ	J AD	100 μF,6.3V,Electrolytic
C809	RC-KZ1170AFZZ	J AF	3.3 μF,6.3V
C810	VCKYTV1EB103K	J AA	0.01 μF,25V
C813	VCSAFA0JJ106M	J AD	10 μF,6.3V,Electrolytic,Tantalum
C814,815	VCKYTV1CF105Z	J AB	1 μF,16V
C816	RC-KZ1170AFZZ	J AF	3.3 μF,6.3V
C818	RC-KZ1170AFZZ	J AF	3.3 μF,6.3V
C819	VCKYTV1CF105Z	J AB	1 μF,16V
C820	VCCCCY1HH151J	J AA	150 pF (CH),50V

MD-S50/MD-S50X

NO.	PART CODE	★	PRICE RANK	DESCRIPTION
C821	VCKYTO1CB105K	J	AD	1 μF,16V
C822	VCKYTV1CB104K	J	AA	0.1 μF,16V
C823	VCCCCY1HH271J	J	AA	270 pF (CH),50V
C824	VCCSCY1HL561J	J	AA	560 pF,50V
C825	VCCCCY1HH121J	J	AA	120 pF (CH),50V
C826	VCCCCY1HH181J	J	AA	180 pF (CH),50V
C827	VCCCCY1HH121J	J	AA	120 pF (CH),50V
C828	VCKYCY1HB821K	J	AA	820 pF,50V
C829	VCKYCY1HB182K	J	AA	0.0018 μF,50V
C831	VCKYTV1CF105Z	J	AB	1 μF,16V
C832~835	VCKYTO1CB105K	J	AD	1 μF,16V
C836	VCKYTV1CF105Z	J	AB	1 μF,16V
C837	VCCSCY1HL391J	J	AA	390 pF,50V
C838	VCKYTO1CB105K	J	AD	1 μF,16V
C840	VCKYTV1CF105Z	J	AB	1 μF,16V
C841	RC-EZ1626AFZZ	J	AD	220 μF,4V,Electrolytic
C843	VCKYTO1CB105K	J	AD	1 μF,16V
C844	VCKYTV1CB184K	J	AC	0.18 μF,16V
C845	VCKYTV1CF105Z	J	AB	1 μF,16V
C846	RC-EZ1626AFZZ	J	AD	220 μF,4V,Electrolytic
C851	VCKYTV1CB184K	J	AC	0.18 μF,16V
C852	VCKYTV1CB334K	J	AC	0.33 μF,16V
C860	VCKYTO1CB105K	J	AD	1 μF,16V
C901	VCKYCY1EF104Z	J	AA	0.1 μF,25V
C902	VCKYCY1EF473Z	J	AB	0.047 μF,25V
C904	RC-KZ1170AFZZ	J	AF	3.3 μF,6.3V
C906,907	VCKYCY1EF104Z	J	AA	0.1 μF,25V
C908,909	VCKYCY1HB472K	J	AA	0.0047 μF,50V
C910~912	VCKYCY1HB682K	J	AA	0.0068 μF,50V
C913	RC-KZ1167AFZZ	J	AD	2.2 μF,6.3V,Electrolytic
C914	VCKYTO1CB105K	J	AD	1 μF,16V

RESISTORS

	VRS-CY1JB000J	J	AA	0 ohm,Jumper,0.8x1.55mm, Green
	VRS-TQ2BB000J	J	AA	0 ohm,Jumper,1.55x3.1mm, Green
R101	VRS-CY1JB154J	J	AA	150 kohms,1/16W
R102	VRS-CY1JB183J	J	AA	18 kohms,1/16W
R104	VRS-CY1JB392J	J	AA	3.9 kohms,1/16W
R105	VRS-CY1JB472J	J	AA	4.7 kohms,1/16W
R106	VRS-CY1JB123J	J	AA	12 kohms,1/16W
R107	VRS-CY1JB124D	J	AA	120 kohms,1/16W
R109	VRS-CY1JB273D	J	AA	27 kohms,1/16W
R111	VRS-CY1JB273D	J	AA	27 kohms,1/16W
R112	VRS-CY1JB124D	J	AA	120 kohms,1/16W
R113	VRS-CY1JB123J	J	AA	12 kohms,1/16W
R116	VRS-CY1JB183J	J	AA	18 kohms,1/16W
R117	VRS-CY1JB224D	J	AA	220 kohms,1/16W
R119,120	VRS-CY1JB473D	J	AA	47 kohms,1/16W
R121	VRS-CY1JB224D	J	AA	220 kohms,1/16W
R122	VRS-CY1JB183J	J	AA	18 kohms,1/16W
R124	VRS-CY1JB273J	J	AA	27 kohms,1/16W
R125	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R126	VRS-CY1JB471J	J	AA	470 ohms,1/16W
R127	VRS-CY1JB391J	J	AA	390 ohms,1/16W
R128,129	VRS-CY1JB102J	J	AA	1 kohm,1/16W
R130	VRS-CY1JB1R0J	J	AA	1 ohm,1/16W
R131	VRS-CY1JB104J	J	AA	100 kohm,1/16W
R132	VRS-CY1JB393J	J	AA	39 kohms,1/16W
R133	VRS-CY1JB154J	J	AA	150 kohms,1/16W
R134	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R136	VRS-CY1JB124J	J	AA	120 kohms,1/16W
R137	VRS-CY1JB223J	J	AA	22 kohms,1/16W
R138	VRS-CY1JB683J	J	AA	68 kohms,1/16W
R139,140	VRS-CY1JB473J	J	AA	47 kohms,1/16W
R141	VRS-CY1JB222J	J	AA	2.2 kohms,1/16W
R142	VRS-CY1JB562J	J	AA	5.6 kohms,1/16W
R143	VRS-CY1JB392J	J	AA	3.9 kohms,1/16W
R144	VRS-CY1JB221J	J	AA	220 ohms,1/16W
R145	VRS-CY1JB335J	J	AA	3.3 Mohms,1/16W
R146	VRS-CY1JB220J	J	AA	22 ohms,1/16W
R147	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R151	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R154	VRS-CY1JB122J	J	AA	1.2 kohms,1/16W
R160	VRS-CY1JB104J	J	AA	100 kohm,1/16W
R161	VRS-CY1JB122J	J	AA	1.2 kohms,1/16W
R204	VRS-CY1JB102J	J	AA	1 kohm,1/16W
R222	VRS-CY1JB105J	J	AA	1 Mohm,1/16W
R223	VRS-CY1JB000J	J	AA	0 ohm,1/16W
R401	VRS-CY1JB334J	J	AA	330 kohms,1/16W

NO.	PARTS CODE	★	PRICE RANK	DESCRIPTION
R402	VRS-CY1JB102J	J	AA	1 kohm,1/16W
R411	VRS-CY1JB104J	J	AA	100 kohm,1/16W
R412	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R413~415	VRS-CY1JB102J	J	AA	1 kohm,1/16W
R416	VRS-CY1JB223J	J	AA	22 kohms,1/16W
R417	VRS-CY1JB104J	J	AA	100 kohm,1/16W
R418	VRS-CY1JB393J	J	AA	39 kohms,1/16W
R423	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R424	VRS-CY1JB104J	J	AA	100 kohm,1/16W
R427	VRS-CY1JB104J	J	AA	100 kohm,1/16W
R428	VRS-CY1JB153J	J	AA	15 kohms,1/16W
R432	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R433,434	VRS-CY1JB104J	J	AA	100 kohm,1/16W
R436	VRS-CY1JB333J	J	AA	33 kohms,1/16W
R437,438	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R441,442	VRS-CY1JB102J	J	AA	1 kohm,1/16W
R444	VRS-CY1JB102J	J	AA	1 kohm,1/16W
R445,446	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R447~449	VRS-CY1JB223J	J	AA	22 kohms,1/16W
R451	VRS-CY1JB104J	J	AA	100 kohm,1/16W
R452	VRS-CY1JB223J	J	AA	22 kohms,1/16W
R453	VRS-CY1JB123J	J	AA	12 kohms,1/16W
R454	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R455	VRS-CY1JB102J	J	AA	1 kohm,1/16W
R481	VRS-CY1JB561J	J	AA	560 ohms,1/16W
R482	VRS-CY1JB102J	J	AA	1 kohm,1/16W
R483	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R501,502	VRS-CY1JB681J	J	AA	680 ohms,1/16W
R503~506	VRS-CY1JB104J	J	AA	100 kohm,1/16W
R511	VRS-CY1JB000J	J	AA	0 ohm,1/16W
R512,513	VRS-CY1JB000J	J	AA	0 ohm,1/16W
R514	VRS-CY1JB000J	J	AA	0 ohm,1/16W
R601	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R602	VRS-CY1JB563J	J	AA	56 kohms,1/16W
R701	VRS-CY1JB183J	J	AA	18 kohms,1/16W
R701A,702A	VRS-TV2AB150J	J	AA	15 ohms,1/10W
R702	VRS-CY1JB183J	J	AA	18 kohms,1/16W
R703,704	VRS-CY1JB100J	J	AA	10 ohm,1/16W
R705,706	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R707,708	VRS-CY1JB682J	J	AA	6.8 kohms,1/16W
R709,710	VRS-CY1JB000J	J	AA	0 ohm,1/16W
R711~713	VRS-CY1JB105J	J	AA	1 Mohm,1/16W
R711A,712A	VRS-CY1JB331J	J	AA	330 ohms,1/16W
R715,716	VRS-CY1JB335J	J	AA	3.3 Mohms,1/16W
R721,722	VRS-CY1JB272J	J	AA	2.7 kohms,1/16W
R723,724	VRS-CY1JB102J	J	AA	1 kohm,1/16W
R725,726	VRS-CY1JB681J	J	AA	680 ohms,1/16W
R801	VRS-CY1JB684D	J	AA	680 kohms,1/16W
R802	VRS-CY1JB474D	J	AA	470 kohms,1/16W
R803	VRS-CY1JB393J	J	AA	39 kohms,1/16W
R804	VRS-CY1JB184D	J	AA	180 kohms,1/16W
R807	VRS-CY1JB474D	J	AA	470 kohms,1/16W
R808	VRS-CY1JB684D	J	AA	680 kohms,1/16W
R809	VRS-CY1JB104J	J	AA	100 kohm,1/16W
R810	VRS-CY1JB101J	J	AA	100 ohm,1/16W
R812	VRS-CY1JB104J	J	AA	100 kohm,1/16W
R813	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R814	VRS-CY1JB681J	J	AA	680 ohms,1/16W
R815,816	VRS-CY1JB563D	J	AA	56 kohms,1/16W
R817	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R818	VRS-CY1JB334J	J	AA	330 kohms,1/16W
R819	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R820	VRS-CY1JB102J	J	AA	1 kohm,1/16W
R821	VRS-CY1JB563D	J	AA	56 kohms,1/16W
R822	VRS-CY1JB683D	J	AA	68 kohms,1/16W
R823	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R824	VRS-CY1JB334J	J	AA	330 kohms,1/16W
R825	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R826,827	VRS-CY1JB102J	J	AA	1 kohm,1/16W
R828	VRS-CY1JB333D	J	AA	33 kohms,1/16W
R829	VRS-CY1JB513D	J	AA	51 kohms,1/16W
R830	VRS-CY1JB272J	J	AA	2.7 kohms,1/16W
R833	VRS-CY1JB223J	J	AA	22 kohms,1/16W
R834	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R835	VRS-CY1JB122D	J	AA	1.2 kohms,1/16W
R836	VRS-CY1JB222D	J	AA	2.2 kohms,1/16W
R837	VRS-CY1JB122D	J	AA	1.2 kohms,1/16W
R838	VRS-CY1JB102J	J	AA	1 kohm,1/16W
R839	VRS-CY1JB103J	J	AA	10 kohm,1/16W
R840	VRS-CY1JB681J	J	AA	680 ohms,1/16W
R841	VRS-CY1JB000J	J	AA	0 ohm,1/16W
R843	VRS-CY1JB104J	J	AA	100 kohm,1/16W

NO.	PART CODE	* PRICE RANK	DESCRIPTION
R844	VRS-CY1JB103J	J AA	10 kohm, 1/16W
R845	VRS-CY1JB102J	J AA	1 kohm, 1/16W
R860	VRS-CY1JB470J	J AA	47 ohms, 1/16W
R901	VRS-CY1JB103J	J AA	10 kohm, 1/16W
R902	VRS-CY1JB104J	J AA	100 kohm, 1/16W
R903,904	VRS-CY1JB153J	J AA	15 kohms, 1/16W
R906	VRS-CY1JB000J	J AA	0 ohm, 1/16W
R907	VRS-CY1JB155J	J AA	1.5 Mohms, 1/16W
R908	VRS-CY1JB105J	J AA	1 Mohm, 1/16W
R909	VRS-CY1JB394J	J AA	390 kohms, 1/16W

OTHER CIRCUITRY PARTS

CN101	QCNCWXX26AFZZ	J AF	Socket, 26Pin
CN601	QCNCW764NAFZZ	J AE	Socket, 13Pin
J701	QJAKM0190AFZZ	J AG	Jack, Remote Control/Headphones
J801	QJAKC0129AFZZ	J AE	Jack, DC IN
M902	RMOTV0470AFM1	J AU	Motor Ass'y [Slide]
SW401	QSW-M0160AFZZ	J AE	Switch, Push Type [OPEN]
SW402	QSW-S0910AFZZ	J AD	Switch, Push Type [HOLD]
SW451	QSW-K0212AFZZ	J AE	Switch, Key Type [PLAY/FF]
SW452	QSW-K0212AFZZ	J AE	Switch, Key Type [STOP/Power Off]
SW453	QSW-K0212AFZZ	J AE	Switch, Key Type [Volume Up]
SW454	QSW-K0212AFZZ	J AE	Switch, Key Type [Volume Down]
SW901	—	—	Switch, Push Type [Lead In]
SW902	—	—	(Ref to No.24 Disc Motor Ass'y)
SW902	—	—	Switch, Push Type [Disc Media]
SW902	—	—	(Ref to No.24 Disc Motor Ass'y)

MD MECHANICAL PARTS

1	LANGK0888AFZZ	J AB	Bracket, Drive Screw
2	LANGK0891AFM1	J AE	Cancel Lever Ass'y
3	LHLDX3130AFM1	J AL	Cartridge Holder Ass'y
4	LX-BZ0800AFZZ	J AA	Screw, $\phi 1.4 \times 2.5$ mm
5	LX-JZ0144AFZZ	J AA	Screw, $\phi 1.7 \times 3$ mm
6	LX-JZ0145AFZZ	J AA	Screw, $\phi 1.7 \times 2$ mm
7	LX-JZ0146AFZZ	J AA	Screw, $\phi 1.7 \times 2.5$ mm
8	LX-JZ0147AFZZ	J AA	Screw, $\phi 1.7 \times 3.5$ mm
9	LX-JZ0148AFZZ	J AA	Screw, $\phi 1.7 \times 3$ mm
10	LX-WZ9279AFZZ	J AA	Washer, $\phi 1 \times \phi 2.4 \times 0.2$ mm
11	MSPRP0813AFFJ	J AB	Spring, Drive Grip
12	MSPRP0815AFFJ	J AB	Spring, Plate
13	MSPRT1561AFFJ	J AB	Spring, Cancel Lever
14	MSPRT1584AFFJ	J AB	Spring, Eject Lever
15	NGERH0516AFZZ	J AB	Wheel, Drive
16	NGERK0082AFZZ	J AD	Gear, Drive
17	NGERZ0040AFZZ	J AC	Grip, Drive
18	NSFTD0320AFZZ	J AE	Shaft, Drive
19	NSFTM0283AFFW	J AC	Shaft, Pickup Guide
20	PCUSG0517AFZZ	J AA	Cushion, Mechanism
21	PCUSG0541AFZZ	J AB	Rubber, Cushion (Right)
22	PCUSG0563AFZZ	J AC	Cushion Motor
23	RCTRH8157AFZZ	J BS	Optical Pickup Unit
24	RMOTV0476AFM1	J BE	Motor Ass'y [Disc]
24-1	—	—	Motor Chassis Ass'y (Not Replacement Item)
24-2	LX-JZ0144AFZZ	J AA	Screw, $\phi 1.7 \times 3$ mm
24-3	LX-WZ9246AFZZ	J AA	Washer, $\phi 1 \times \phi 2.4 \times 0.25$ mm
24-4	LX-WZ9272AFZZ	J AA	Washer, $\phi 1.2 \times \phi 3.2 \times 0.25$ mm
24-5	NSFTM0284AFFW	J AC	Shaft, Guide
24-6	NTNT-0148AFM1	J AP	Turntable Ass'y
24-7	PCOVP1332AFZZ	J AC	Label, Mechanism
24-8	PCOVP3211AFZZ	J AE	Cover, Mechanism
24-9(SW901)	—	—	Switch, Push Type [Lead In]
24-10(SW902)	—	—	Switch, Push Type [Disc Media]
24-11(VR101)	—	—	Semi-VR, 68 kohms (B)
100	KRPLF0017AF01	J BG	Mechanism Ass'y
M902	RMOTV0470AFM1	J AU	Motor Ass'y [Slide]

CABINET PARTS

201	CCAB-1785AF07	J AU	Center Cabinet Ass'y
201-1	—	—	Center Cabinet (Not Replacement Item)
201-2	HDECA0738AFSD	J AL	Plate, Decoration
201-3	PSHEZ0638AFZZ	J AC	Sheet, Decoration Plate
202	CFTAC3126AF07	J AY	Disc Cover Ass'y [For X]
202	CFTAC3126AF09	J AY	Disc Cover Ass'y [For USA]

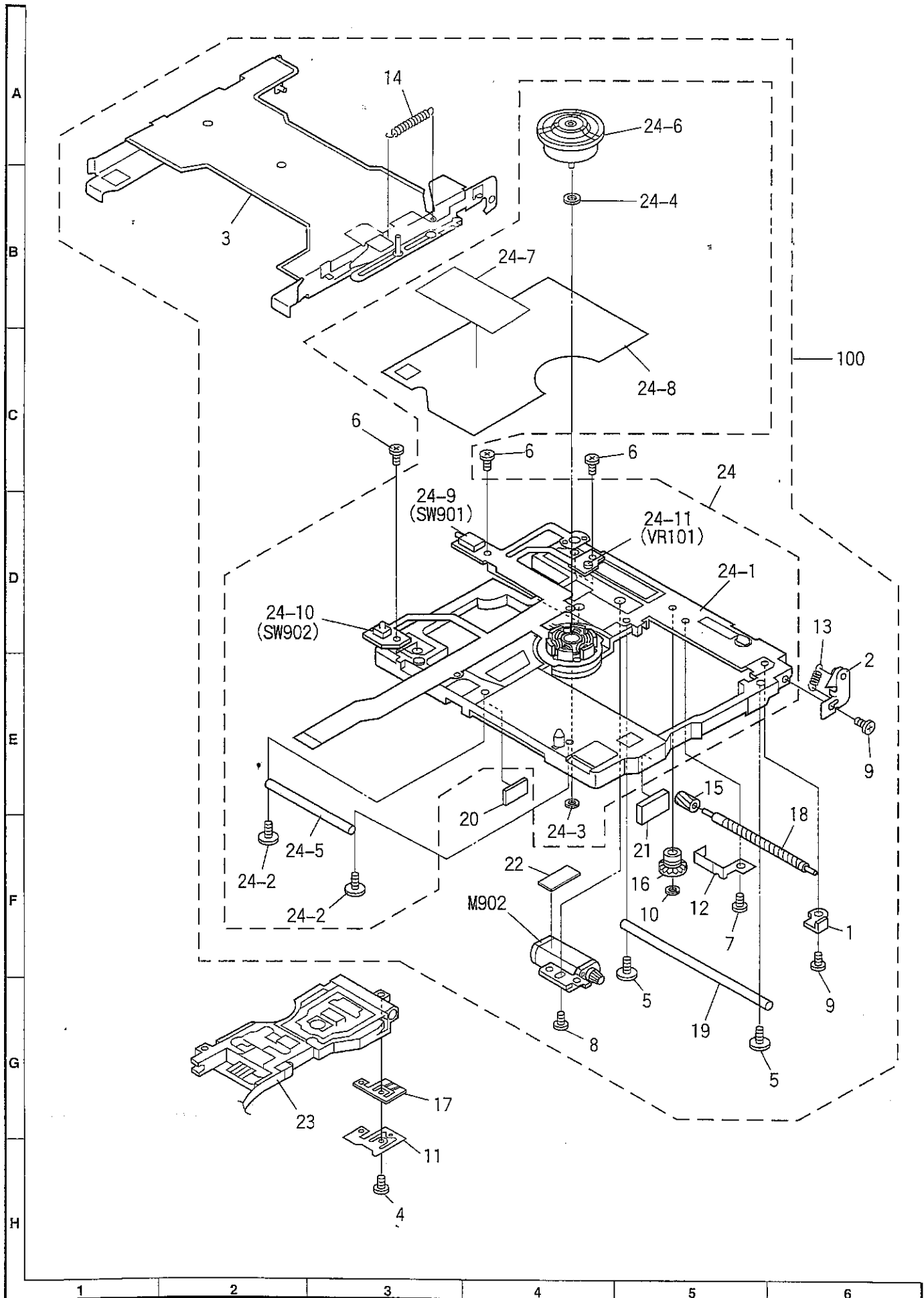
NO.	PARTS CODE	* PRICE RANK	DESCRIPTION
202-1	—	—	Disc Cover (Not Replacement Item)
202-2	HDECO0492AFSA	J AH	Plate, Decoration
202-3	MSPRP0833AFFW	J AC	Spring, Cartridge Guide (L)
202-4	MSPRP0834AFFW	J AC	Spring, Cartridge Guide (R)
202-5	PSHEZ0633AFZZ	J AC	Sheet, Cartridge Guide (L)
202-6	PSHEZ0634AFZZ	J AC	Sheet, Cartridge Guide (R)
202-7	PSHEZ0636AFZZ	J AC	Sheet, Decoration Plate
202-8	TLABM0536AFZZ	J AC	Feature Label
202-9	LANGZ0308AFFC	J AD	Bracket, Stop
202-10	TLABS0465AFZZ	J AB	Label, Laser [For X]
203	CFTAU3191AF01	J AU	Bottom Cabinet Ass'y [For X]
203	CFTAU3192AF01	J AU	Bottom Cabinet Ass'y [For USA]
203-1	—	—	Bottom Cabinet (Not Replacement Item)
203-2	GCOVH1289AFSA	J AC	Cover, DC Jack
203-3	JKNBP0417AFSB	J AE	Knob, Hold
203-4	PSHEZ0635AFZZ	J AC	Sheet, Insulator
203-5	TLABM0535AFZZ	J AD	Label, Specifications [For TAIWAN]
204	GCOVH1288AFSA	J AC	Cover, Headphones Jack
205	GFTAB1314AFSF	J AE	Cover, Battery
206	JKNBP0422AFSA	J AD	Knob, Eject
207	JKNBR0687AFSA	J AF	Button, Operation
208	LANGK0908AFFW	J AC	Bracket, Battery Guide
210	LANGZ0311AFM1	J AK	Bracket Eject Knob Ass'y
211	LANGZ0312AFM1	J AE	Bracket Battery Cover Ass'y
212	LHLDZ3227AFM1	J AM	Frame Ass'y
213	LHLDZ1651AFSF	J AD	Holder, + Terminal
214	LHLDZ1652AFSA	J AC	Holder, - Terminal
215	MSPRC0987AFZZ	J AB	Spring, Battery Out
216	PCUSG0534AFZZ	J AC	Rubber, Preventive Vibration
219	PSHEZ0662AFZZ	J AB	Sheet, + Terminal
221	PSHEZ0641AFZZ	J AB	Shield Sheet, DC Jack
222	QTANZ9134AFFQ	J AC	Terminal, +, Rechargeable Battery
223	QTANZ9135AFFQ	J AD	Terminal, -, Rechargeable Battery
224	TLABN0088AFS1	J	Label, Serial No. [Except For USA]
224	TLABN0928AFS1	J	Label, Serial No. [EXCEPT TAIWAN]
224	TLABN0929AFS1	J	Label, Serial No. [For TAIWAN]
224	TLABN0930AFS1	J	Label, Serial No. [For USA]
601	LX-BZ0908AFFC	J AB	Screw, $\phi 1.4 \times 2$ mm
602	LX-BZ0877AFCC	J AB	Screw, $\phi 1.4 \times 1.5$ mm
603	LX-BZ0805AFFN	J AB	Screw, $\phi 1.7 \times 2.5$ mm

ACCESSORIES/PACKING PARTS

△	RADPA3406AFZZ	J BE	AC Adapter [For USA]
△	RADPA5402AFZZ	J BF	AC Adapter [For Singapore, Except for TAIWAN/Hong Kong]
△	RADPA5403AFZZ	J BF	AC Adapter [For Taiwan]
△	RADPA8404AFZZ	J BK	AC Adapter [For Hong Kong]
△	RPHOH0167AFZZ	J AY	Stereo Headphones Unit [For X]
△	RPHOH0168AFZZ	J BB	Stereo Headphones Unit [For USA]
	RRMCW0010AFSA	J BE	Remote Control (AD-S50RM)
	SPAKA2631AFZZ	J AE	Packing Add.
	SPAKC6226AFZZ	J AL	Packing Case [For X]
	SSAKH0289AFZZ	J AD	Polyethylene Bag, Unit
	UBAGC0060AFSA	J AK	Carrying Bag
	UBATI0031AFSA	J BE	Rechargeable, Battery [For X]
	UBATI0037AFSA	J	Rechargeable, Battery [For USA]
	SPAKZ0422AFZZ	J AE	Case, Adapter [For X]
	SPAKZ0423AFZZ	J AD	Pad, AC Adaptor [For X]
	SPAKZ0379AFZZ	J AF	Case, Unit
	TCAUZ0354AFZZ	J AD	Caution Label [For TAIWAN]
	TCAUH0341AFZZ	J AD	Caution, Headphone [For USA]
	TINSZ1305AFZZ	J AP	Operation Manual [For X]
	TLABZ2136AFZZ	J AB	Caution Label [For Hong Kong]
	TINSZ1307AFZZ	J AH	Operation Manual [For USA]
	TINSZ1309AFZZ	J	Quick Guide, Spanish [For USA]

P.W.B. ASSEMBLY (Not Replacement Item)

PWB-A	DCYO-2963AF93	J —	Main [For USA Only]
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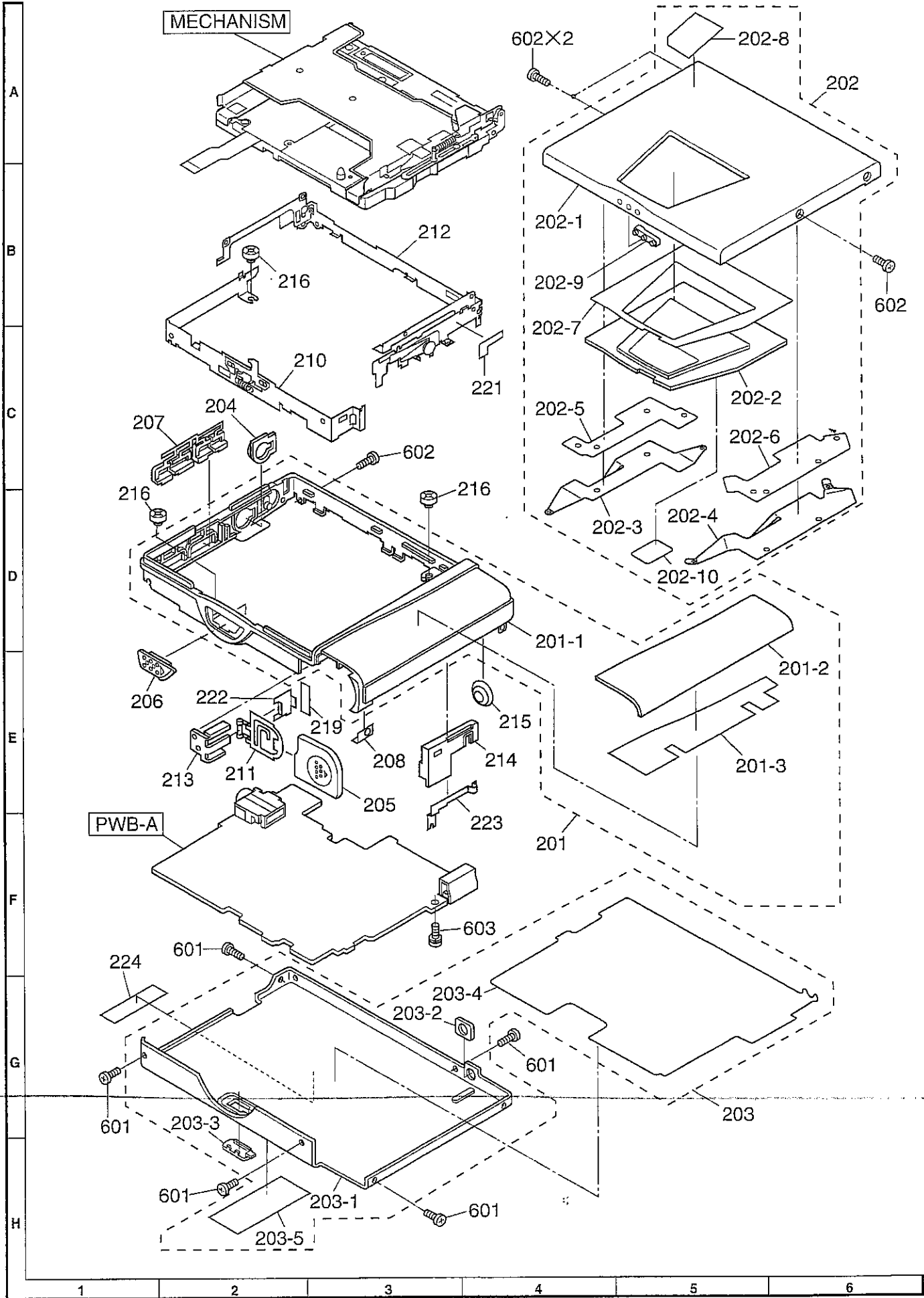
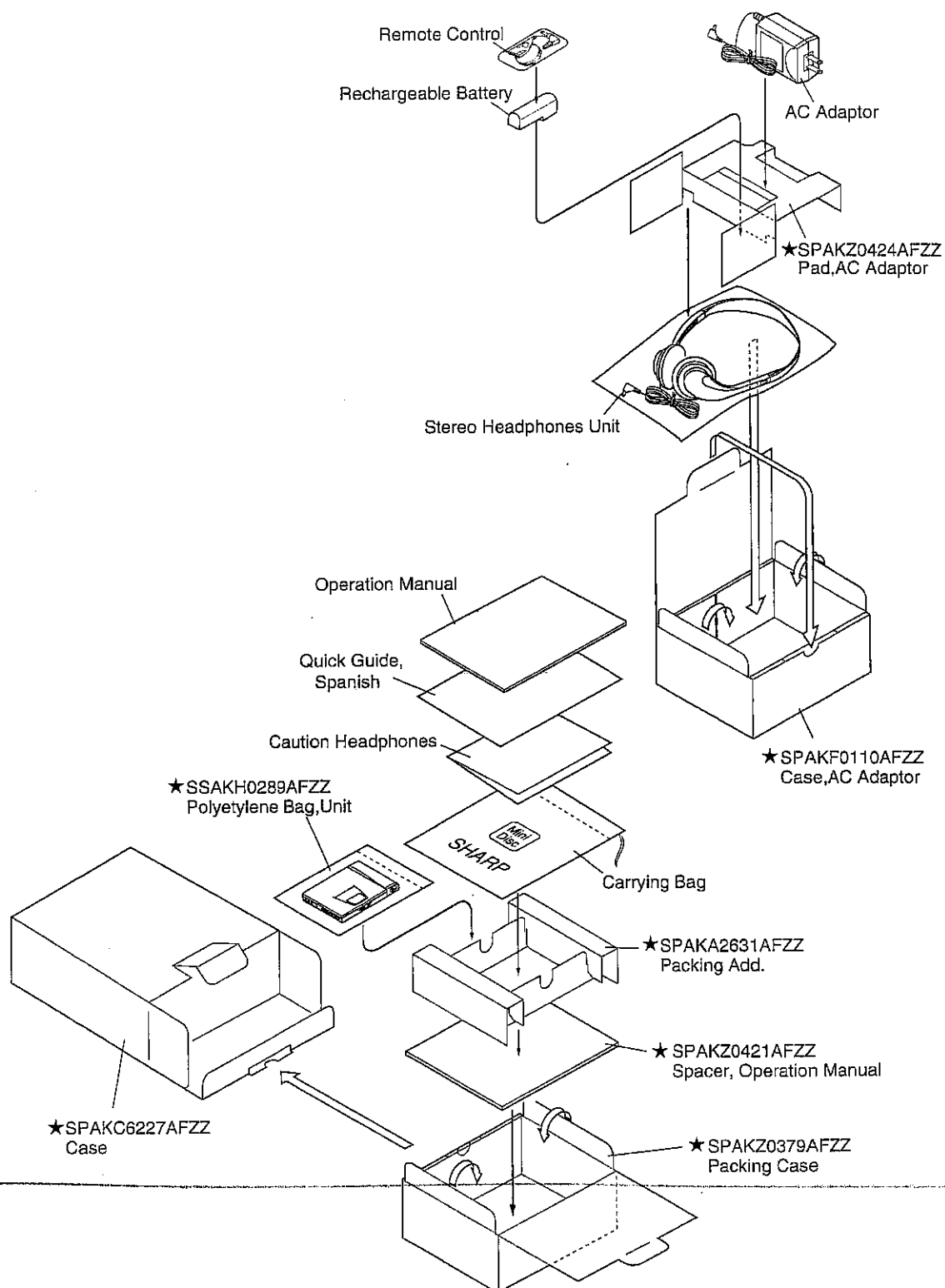


Figure 5 CABINET EXPLODED VIEW

—MEMO—

PACKING OF THE SET(FOR MD-S50 ONLY)

SETTING POSITION OF SWITCHES AND KNOBS		
UNIT	Disc Cover	CLOSE
	HOLD	OFF
Remote Control	HOLD	CANCEL



★: Not Replacement Item